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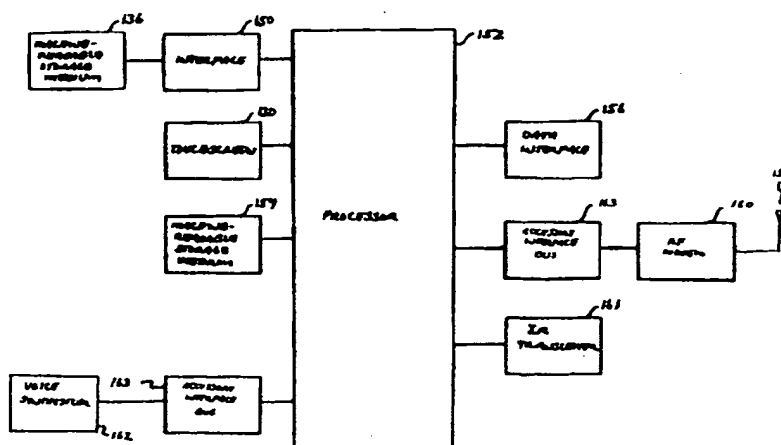
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(54) Title: ELECTRONIC BOOK AND METHOD OF CAPTURING AND STORING A QUOTE THEREIN



(57) Abstract

A method of capturing and storing a quote in an electronic book includes reading machine-readable data from a removable machine-readable storage medium (136) installed in the electronic book, and displaying text of a book represented by the machine-readable data. A user-initiated event is received in which a portion of the text is selected. Quote data representative of the portion of the text is stored in an internal machine-readable storage medium (154) within the electronic book. Source data representative of at least one of an author of the book and a title of the book is also stored in the internal machine-readable storage medium (154). The quote data and the source data are maintained in the internal machine-readable storage medium (154) when the removable machine-readable storage medium (136) is removed from the electronic book.

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0 ELECTRONIC BOOK AND METHOD OF CAPTURING
AND STORING A QUOTE THEREIN

Related Invention

5 The present invention is related to the
following invention which is assigned to the same
assignee as the present invention:

"System and Method for Limiting Access to a Book
10 Card", having Serial No. 08/572,346, filed December
14, 1995.

"Apparatus and Method for Storing and Presenting
Text", having Serial No. 08/572,451, filed December
14, 1995.

15 "Method and Electronic Book for Creating a
Plurality of Versions of a Book", having Serial No.
08/572,485, filed December 14, 1995.

"Electronic Book Diary and Method For Use
Therefore", having Serial No. 08/572,602, filed
20 December 14, 1995.

"Method and Device for Inhibiting the Operation
of an Electronic Device During Take-Off and Landing
of an Aircraft", having Serial No. 08/572,603, filed
December 14, 1995.

25 "System for Inhibiting the Operation of an
Electronic Device During Take-Off and Landing of an
Aircraft", having Serial No. 08/572,484, filed
December 14, 1995.

"Method for Abridging Text", having Serial No.
30 08/572,834, filed December 14, 1995.

"A Method of Substituting Names in an Electronic
Book", having Serial No. 08/572,480, filed December
14, 1995.

0 "System and Method of Authoring Tools for an
Electronic Book", having Serial No. 08/572,358, filed
December 14, 1995.

"System and Method for an Automatic Library for
a Plurality of Book Cards", having Serial No.
5 08/572,482, filed December 14, 1995.

"Electronic Book and Method of Selecting a
Primary Font and a Primary Size for Displaying Text
Therewith", having Serial No. 08/572,407, filed
December 14, 1995.

10 "Electronic Book and Graphical User Interface
for Selecting a Book to Read Therewith", having
Serial No. 08/572,406, filed December 14, 1995.

"Electronic Book and Graphical User Interface to
Provide Control Thereof", having Serial No.
15 08/572,403, filed December 14, 1995.

"Electronic Book and Method of Storing at Least
One Book in an Internal Machine-Readable Storage
Medium", having Serial No. 08/572,593, filed December
14, 1995.

20 "Electronic Book and Method of Annotation
Therefor", having Serial No. 08/572,367, filed
December 14, 1995.

"Electronic Book and a Method of Displaying a
Relative Position of a Current Page of a Book
25 Therefor", having Serial No. 08/572,373, filed
December 14, 1995.

"Method and System for Encoding a Book for
Reading Using an Electronic Book", having Serial No.
08/572,468, filed December 14, 1995.

30 "Electronic Book and Method of Displaying an
Animated Page Turn Therefor", having Serial No.
08/572,405, filed December 14, 1995.

0 "Electronic Book and Method of Controlling a
Rate of Information Displayed Thereby", having Serial
No. 08/572,372, filed December 14, 1995.

"Reusable Housing and Memory Card Therefor",
having Serial No. 08/572,413, filed December 14,
5 1995.

"Electronic Book and Method of Displaying at
Least One Reading Metric Therefor", having Serial No.
08/572,842, filed December 14, 1995.

"Electronic Book and Method of Creating a
10 Personal Log of Reading Activity Therefor", having
Serial No. 08/572,456, filed December 14, 1995.

"Electronic Book Having Highlighting Feature",
having Serial No. 08/572,469, filed December 14,
1995.

15 The subject matter of the above-identified
related inventions are hereby incorporated by
reference into the disclosure of this invention.

Field of the Invention

20

The present invention relates to electronic
books having the look and feel of real paper books
and methods of capture and storing a quote therein.

25

Background of the Invention

Various types of hand-held electronic reading
devices have been proposed to electronically display
textual information for reading by a user. A typical
30 hand-held electronic reading device includes a
display device to display the textual information and
a user interface which allows a user to navigate
through the textual information and access various
features of the electronic reading device. The

0 display device and the user interface are
incorporated in a hand-held housing to facilitate
portability of the electronic reading device.

Many hand-held electronic reading devices have a
user interface in the form one or more external
5 buttons. The buttons are depressed in a
predetermined manner either to navigate through the
textual information or to access various features of
the device. However, many hand-held electronic
reading devices implement the user interface in a
10 manner which does not provide a simple, intuitive, or
efficient method for navigating the textual
information or for accessing the features.

The lack of simplicity of using current hand-
held electronic reading devices along with the lack
15 of comfort in handling many of these devices result
in some people preferring to read a real paper book
rather than using a hand-held electronic reading
device.

Further, current hand-held electronic reading
20 devices are limited in their ability to internally
store and recall portions of the textual information.
U.S. Patent No. 5,239,665 to Tsuchiya discloses an
electronic book having an interface which receives an
external memory, such as a floppy disk or a laser
25 card, containing the textual information. A random
access memory (RAM) within the electronic book
functions to tentatively store a part of the content
of the external memory. The part of the content is
stored in the RAM so that a reader is not required to
30 wait an excessive amount of time to view a display of
a subsequent piece of information. Tsuchiya teaches
that the amount of information to be transferred from
the external memory to the RAM is dependent upon the
speed at which a reader can read a book. As a

0 result, the user has limited control, if any, with
regard to storing and recalling portions of the
textual information.

Brief Description of the Drawings

5

The invention is pointed out with particularity
in the appended claims. However, other features of
the invention will become more apparent and the
invention will be best understood by referring to the
10 following detailed description in conjunction with
the accompanying drawings in which:

FIG. 1 is a view of an embodiment of an
electronic book in a closed position;

15 FIG. 2 is a view of the embodiment of the
electronic book of FIG. 1 in an open position;

FIG. 3 is a block diagram of an embodiment of
the electronic book;

20 FIG. 4 is an illustration of various hot spot
locations used to provide control of the electronic
book to a user;

FIG. 5 is an illustration of a library screen
display using an embodiment of the electronic book;

25 FIG. 6 is an illustration of a user-initiated
event to open the desired book from the library
screen;

FIG. 7 is an illustration of a first page of a
book displayed on an embodiment of the electronic
book;

30 FIG. 8 is an illustration of a title page of a
book displayed on an embodiment of the electronic
book;

FIG. 9 is an illustration of a font selection
page displayed on an embodiment of the electronic
book;

0 FIG. 10 is an illustration of the title page of the book which is displayed upon exiting the font selection page;

5 FIG. 11 is an illustration of a system control page displayed in an embodiment of the electronic book;

 FIG. 12 is an illustration of the title page of the book which is displayed upon exiting the system control page;

10 FIG. 13 is an illustration of the title page of the book wherein a radio frequency link option is selected;

 FIG. 14 is an illustration of the title page of the book wherein a pacing control option is selected by a user;

15 FIG. 15 is an illustration of a pacing control page displayed in an embodiment of the electronic book;

 FIG. 16 is an illustration of the title page of the book which depicts other user-initiated options;

20 FIG. 17 is an illustration of a page marked by a dog ear for use in embodiments of the electronic book;

 FIG. 18 is an illustration of a dog ear dialog box used in embodiments of the electronic book;

25 FIG. 19 is an illustration of a user selecting a portion of a page of text;

 FIG. 20 is an illustration of an option selection dialog box used in embodiments of the electronic book;

30 FIG. 21 is an illustration of an annotation display used in embodiments of the electronic book;

 FIG. 22 is an illustration of a marker used to indicate that a page has an annotation associated therewith;

0 FIG. 23 is an illustration of a user selecting a
set. bookmark option in the option selection dialog
box;

 FIG. 24 is an illustration of the page of FIG.
23 having a bookmark displayed thereon;

5 FIG. 25 is a flow diagram of an event loop
performed in an embodiment of the electronic book;

 FIG. 26 is a flow diagram of steps performed in
an embodiment of a library graphical user interface
routine for use in the electronic book;

10 FIGS. 27 and 28 show flow diagrams of an
embodiment of the routine to display pages of text in
the electronic book;

 FIG. 29 is a flow diagram of steps performed to
display a current page in the electronic book;

15 FIG. 30 is a flow diagram of steps performed in
an embodiment of an annotation subroutine;

 FIG. 31 is a flow diagram of steps performed in
an embodiment of a quote capture subroutine;

20 FIG. 32 is a flow diagram of steps performed in
an embodiment of a dog ear subroutine;

 FIG. 33 is a flow diagram of steps performed in
an embodiment of a pacing control subroutine;

 FIG. 34 is a flow diagram of steps performed in
an embodiment of the font selection subroutine; and

25 FIG. 35 is a flow diagram of steps performed in
an embodiment of the system control subroutine.

Detailed Description of a Preferred Embodiment

30 Embodiments of the present invention
advantageously provide an electronic book with a
quotable quotes feature which allows a user to select
a passage from a book being read, and save that
passage to a memory internal to the electronic book

0 for later recall. As a result, the passage can be recalled regardless of whether an external memory containing the book is installed in the electronic book. The passage which is written to the internal memory automatically includes source information such
5 as the title and the author of the book. This is beneficial in allowing for quotes from multiple sources to be simultaneously stored in the internal memory.

FIG. 1 is a view of an embodiment of an
10 electronic book in a closed position. The electronic book has a book-shaped housing 100 having the look and feel of a real, paper book. The book-shaped housing 100 has a first housing member 102 pivotably connected to a second housing member 104 to
15 facilitate opening and closing in a book-like manner. The first housing member is partially formed by a book-like, front cover member 106. In a similar manner, the second housing member 104 is partially formed by a book-like, back cover member 108. The
20 front cover member 106 and the back cover member 108 are pivotably connected by a spine member 110.

To better provide the look and feel of a real book, the front cover member 106 and the back cover member 108 have an exterior made of a material used
25 in real book covers. Examples of such a material include, but are not limited to, leather, simulated leather, vinyl, and a woven fabric such as cotton. The exterior can either be permanently affixed to the front cover member 106 and the back cover member 108,
30 or be in the form of a removable jacket.

In addition to the front cover member 106, the first housing member 102 is partially defined by an enclosure 112. Similarly, the second housing member 104 is partially defined by an enclosure 114 in

0 addition to the back cover member 108. When the
electronic book is in the closed position, the
enclosure 112 and the enclosure 114 have an external
appearance of edges of pages of a real, paper book.
In particular, the enclosures 112 and 114 define a
5 top edge 116, a bottom edge 118, and a foreedge 120
which appear as the top edge, the bottom edge, and
the foreedge, respectively, of a real, paper book.
The top edge 116, the bottom edge 118, and the
foreedge 120 are recessed with respect to the front
10 cover member 106 and the back cover member 108.

FIG. 2 is a view of the embodiment of the
electronic book of FIG. 1 in an open position. It is
preferred that the first housing member 102 and the
second housing member 104 be substantially symmetric
15 so that the front cover member 106, the back cover
member 108, and the spine member 110 rest
substantially flat on a flat surface in the open
position. The substantial symmetry makes the
electronic book feel like a real, paper book being
20 opened to one of its middle pages. As a result, the
electronic book can be comfortably held and read in a
manner consistent with a paper book.

A touchscreen 130 is integrated in the book-
shaped housing 100 to be accessible when the book-
25 shaped housing 100 is opened in the book-like manner.
In the embodiment illustrated in FIG. 2, the
touchscreen 130 is integrated with the enclosure 114
of the second housing member 104. Optionally, a
second touchscreen 132 can also be integrated in the
30 book-shaped housing. As illustrated, the second
touchscreen 132 can be integrated with the enclosure
112 of the first housing member 102.

The touchscreen 130 and the second touchscreen
132 each include a touch-sensitive panel over a

0 display device. Behind the display device can be a
backlighting element.

The touchscreen 130 and the second touchscreen
132 may provide either a color display or a
monochrome display depending on a particular model of
5 the electronic book. To provide their touch
sensitivity, the touchscreen 130 and the second
touchscreen 132 can utilize analog resistive
technology as is known in the art. It is noted,
however, that other technologies for providing touch
10 sensitivity can also be utilized.

It is preferred that the touchscreen 130 and the
second touchscreen 132 be capable of providing
backlighting to allow use of the electronic book in
poorly-lit or dimly-lit environments. More
15 preferably, the touchscreen 130 is capable of
backlighting selected portions or subsets of the
entire touchscreen 130. Here, the electronic book
can provide a power-saving mode wherein only a
portion of the touchscreen 130 being viewed by a user
20 is actively backlit.

The book-shaped housing includes a receiving
slot 134 which physically receives a removable
machine-readable storage medium 136. The removable
machine-readable storage medium 136 contains machine-
25 readable data representative of text from a book.
Optionally, the machine-readable data is also
representative of graphical information within the
book. It is noted that the term "book" should be
construed broadly as any written or printed
30 composition having textual information which is read
by an individual. Hence, the term "book" should be
inclusive of books, magazines, newspapers, or the
like.

0 The text and the graphical information contained
in the removable machine-readable storage medium 136
are displayed on the touchscreen 130. The second
touchscreen 132 can be included to display graphical
information while the touchscreen 130 displays text.
5 As another option, the touchscreen 130 and the second
touchscreen 132 can display neighboring pages of the
book. Further, the touchscreen 130 and the second
touchscreen 132 can be utilized to simultaneously
view two books. The second touchscreen 132 can also
10 be utilized in a second level operating system, which
is herein called an advanced reader graphical user
interface. The functionality of the second
touchscreen 132 can be selected by the user using a
switch or the advanced reader graphical user
15 interface in the electronic book.

It is noted that there are a number of ways to
encode the text and the graphical information within
the book for storage on the removable machine-
readable storage medium 136. In one embodiment, the
20 removable machine-readable storage medium 136
contains a series of pointers which point to words
contained in a dictionary within the electronic book.
Words which are not contained in the dictionary are
located in a customized dictionary on the removable
25 machine-readable storage medium 136. In this way,
the words to be presented on the touchscreen 130 are
selected with minimal storage requirements in the
removable machine-readable storage medium 136.

Preferably, the removable machine-readable
30 storage medium 136 is in the form of either a smart
card or a PCMCIA card. Here, the receiving slot 134
is shaped to receive either a smart card or a PCMCIA
card.

0 The book-shaped housing 100 further defines a
power-receiving port 138 and a data-receiving port
140. The power-receiving port 138 receives a plug or
other type of connector to supply power to the
electronic book. Power supplied to the electronic
5 book via the power receiving port 138 can be used to
directly operate the electronic book or to recharge
batteries internal to the electronic book. In one
embodiment of the electronic book, the spine member
110 is shaped to receive a combination of battery
10 cells which can be recharged via the power-receiving
port 138. If the second touchscreen 132 is not used,
the enclosure 112 of the first housing member 102 can
be used to store extra batteries and/or extra book
cards.

15 The data port 140 is utilized to communicate
signals representative of machine-readable data
between the electronic book and an external device.
The data port 140 can be used, for example, to
receive machine-readable data signals representative
20 of text and graphics in a book from the external
device for storage in the electronic book. In this
manner, the data port 140 provides an alternative to
the receiving slot 134 for receiving text and
graphics of a book. Additionally, the data port 140
25 can be utilized to transmit machine-readable data
contained within the electronic book to the external
device.

 Preferably, the electronic book is automatically
activated (i.e., automatically turns on) when in the
30 open position, and is automatically deactivated (i.e.
automatically turns off) when in the closed position.
To this end, the electronic book can include a magnet
142 incorporated within one of the first housing
member 102 or the second housing member, and a reed

0 switch 144 incorporated within the other housing
member. When the electronic book is in the closed
position, the magnet 142 is proximate to the reed
switch 144. The magnetic field generated by the
magnet 142 causes the reed switch 144 to assume a
5 first switch position which deactivates the
electronic book. When the electronic book is in the
open position, the magnet 142 is distant from the
reed switch 144. In absence of a significant
magnetic field, the reed switch 144 returns to a
10 second switch position which activates the electronic
book.

It is noted that in alternative embodiments, the
electronic book is activated and deactivated by an
external switch or button (not specifically
15 illustrated) rather than by the reed switch 144.

FIG. 3 is a block diagram of an embodiment of
the electronic book. An interface 150 receives the
removable machine-readable storage medium 136
containing machine-readable data representative of
20 text and graphics from a book. In a preferred
embodiment of the present invention, the interface
150 comprises a PCMCIA interface which receives a
removable machine-readable storage medium in the form
of a PCMCIA card. Physically, the interface 150 is
25 proximate to the receiving slot 134 illustrated in
FIG. 2.

In general, it is preferred that the interface
150 be capable of receiving an external device other
than a machine-readable storage medium. Further, it
30 is preferred that the interface 150 be capable of
receiving a plurality of external devices. To these
ends, the interface 150 can comprise a plurality of
similar interfaces, such as a plurality of PCMCIA
interfaces. Here, the electronic book can

0 simultaneously receive two or more of a PCMCIA memory
card, a PCMCIA modem, or another PCMCIA device.

A processor 152 is in communication with the
interface 150 to read the machine-readable data from
the removable machine-readable storage medium 136.

5 The processor 152 can be in the form of a
microprocessor, a custom integrated circuit, an
application specific integrated circuit, or a
programmable logic array, for example. Physically,
the processor 152 is housed within the book-shaped
10 housing 100.

The touchscreen 130 is in communication with the
processor 152 to display a page of the text and/or
the graphics represented by the machine-readable
data. Further, the touchscreen 130 acts as an input
15 device to receive user-initiated events, i.e. user-
initiated actions, and communicate these user-
initiated events or actions to the processor 152.

An internal machine-readable storage medium 154
is in communication with the processor 152 to support
20 a number of operative features of the electronic
book. The internal machine-readable storage medium
154 can include one or more memory devices, such as a
random access memory, a read-only memory, and/or an
electronically erasable and programmable read-only
25 memory (EEPROM).

A computer program or other form of software or
firmware is stored in the internal machine-readable
storage medium 154. The computer program directs the
processor 152 to support the operative features of
30 the electronic book. Preferably, the computer
program includes an event loop that processes and
responds to user-initiated events and actions. More
specifically, received events are placed in an event
queue in the internal machine-readable storage medium

0 154. Each of the received events is processed and removed from the event queue. As a result, a user can initiate a number of events or actions without having to wait for previous actions to be processed.

5 The internal machine-readable storage medium 154 can also include a dictionary to which pointers stored in the removable machine-readable storage medium 136 point. By including the dictionary within the electronic book, less storage space is required on the removable machine-readable storage medium 136 to store the text from the book.

10 Further, the internal machine-readable storage medium 154 can contain machine-readable data representative of text and graphics from a book. Here, the processor 152 reads the machine-readable data from the internal machine-readable storage medium 154 and commands the touchscreen 130 to display pages of the text and graphics.

15 Signals are communicated between the electronic book and an external device via either a data interface 156 in communication with the processor 152, via an antenna 158 and a radio frequency modem 160 in communication with the processor 152, or via an infrared transceiver 161 in communication with the processor. As another option, communication between the electronic book and the external device can be effectuated using either a smart communication card or a PCMCIA communication card received by the interface 150. Here, a PCMCIA modem card or a PCMCIA infrared transceiver card can be utilized, for example, for external communication.

30 Optionally, a voice synthesizer 162 is included in the electronic book to provide a spoken auditory display of pages of the text read from either the removable machine-readable storage medium 136 or the

0 internal machine-readable storage medium 154. In one
embodiment, the processor 152 directly converts the
text from the book into speech signals for the voice
synthesizer 162. Optionally, control codes can be
provided within the removable machine-readable
5 storage medium 136 to allow words to be pronounced or
emphasized in different ways. Further, the control
codes can command the words to be spoken in either a
male voice, a female voice, or a child's voice. The
synthesized voice can be sampled (such as using the
10 user's voice) or can be a computer-synthesized voice.

As an alternative, a custom voice dictionary can
be provided to augment a general voice dictionary
stored in the electronic book. The customized voice
dictionary can be used for alternative
15 pronunciations, voices, and emphasis.

The voice synthesizer 162 is either permanently
integrated in the electronic book or is a removable
accessory. To facilitate removability, the voice
synthesizer 162 can be embodied within a smart card
20 or a PCMCIA card for reception by the interface 150.
Alternatively, the voice synthesizer 162 can
communicate with the processor 152 via an accessory
interface bus 163. In a similar manner, the RF modem
160 and/or the second touchscreen 132 can communicate
25 with the processor 152 via the accessory interface
bus 163.

Before giving a detailed description of steps
performed by the elements of FIG. 3 for the various
embodiments of the present invention, a functional
30 description of a particular embodiment of the
electronic book will now be described. This
embodiment is based on a single touchscreen, namely
the touchscreen 130, to display the text and the
graphics of the book and to allow a user to control

0 the electronic book. It is noted, however, that the
teachings herein can also be applied to a dual
touchscreen embodiment which further includes the
second touchscreen 132. Furthermore, it is noted
that the teachings herein are not limited to the use
5 of a touchscreen, and hence, can be applied to an
electronic book containing any type of display device
(such as a liquid crystal display or a cathode ray
tube, for example) and any type of input device (such
as a series of buttons, a mouse, a trackball, a
10 lightpen, or a touchpad, for example).

FIG. 4 is an illustration of various hot spot
locations used to provide control of the electronic
book to a user. A page of the text represented by
the machine-readable data read from either the
15 removable machine-readable storage medium 136 or the
internal machine-readable storage medium 154 is
displayed on a display portion 168 of the touchscreen
130. The display portion 168 is also utilized to
display graphics represented by the machine-readable
20 data.

A first hot spot portion 170 of the touchscreen
130 is designated for receiving a predetermined user-
initiated event which requests that a subsequent page
of the text be displayed on the touchscreen 130.
25 Hence, the first hot spot portion 170 can be
synonymously referred to as an "advance page portion"
or an "advance page hot spot" for receiving an
advance page event. In the embodiment illustrated in
FIG. 4, the first hot spot portion 170 includes a top
30 margin portion 172, a side margin portion 174, and a
bottom margin portion 176 of the touchscreen 130.
The top margin portion 172 is located above the
display portion 168, the side margin portion 174 is
located beside the display portion 168, and the

0 bottom margin portion 176 is located below the display portion 168.

A second hot spot portion 178 of the touchscreen 130 is designated for receiving a predetermined user-initiated event which requests that a previous page
5 of the text be displayed. Hence, the second hot spot portion 178 can be synonymously referred to as a "page back portion" or a "page back hot spot" for receiving a page back event. In the embodiment
10 178 is located beside the display portion 168 of the touchscreen 130 and opposite the side margin portion 174.

A third hot spot portion 180 of the touchscreen 130 is designated for receiving a predetermined user-
15 initiated event which requests that a pre-marked page be displayed on the touchscreen 130. In the embodiment of FIG. 4, the third hot spot portion 180 is located in an upper portion of the touchscreen 130 and is shaped as a bookmark graphic 182. Hence, the
20 third hot spot portion 180 can be synonymously referred to as a "bookmark portion" or a "bookmark hot spot".

A fourth hot spot portion 184 of the touchscreen 130 is designated for receiving a predetermined user-
25 initiated event to close the current book being read and to request that a library screen be displayed on the touchscreen 130. The library screen is utilized by a user to select a book to read from a plurality of books within a library. Hence, the fourth hot
30 spot portion 184 can be synonymously referred to as a "close book portion" or a "close book hot spot" for receiving a close book event.

A fifth hot spot portion 186 of the touchscreen 130 is designated for receiving a predetermined user-

0 initiated event which requests that the displayed
page be marked. In the embodiment of FIG. 4, the
fifth hot spot portion 186 is located in an upper
corner of the touchscreen 130. In this embodiment,
the fifth hot spot portion 186 of the touchscreen 130
5 is utilized for dog-earring pages of the book.
Hence, the fifth hot spot portion 186 can be
synonymously referred to as a "dog ear portion" or a
"dog ear hot spot" for receiving a dog ear event.

A sixth portion 188 of the touchscreen 130 is
10 designated to provide a depth indication
representative of how much of the book is left to be
read. In the embodiment illustrated in FIG. 4, the
sixth portion 188 is located above the display
portion 168. The second hot spot portion 178 can be
15 utilized in conjunction with the sixth portion 188 to
provide the depth indication.

In the embodiment of FIG. 4, the display portion
168, the first hot spot portion 170, the second hot
spot portion 178, the third hot spot portion 180, the
20 fourth hot spot portion 184, and the fifth hot spot
portion 186 are mutually exclusive (i.e. non-
overlapping) portions of the touchscreen 130.
However, in alternative embodiments of the present
invention, these portions may not be mutually
25 exclusive, and hence may overlap. Further, some
embodiments of the present invention may utilize
different sizes and positions for the above-described
hot spot portions.

Preferably, the hot spot portions are motion
30 sensitive so that a touch event, a touch-and-hold
event, and a drag event can be sensed to initiate
differing responses. For example, a page back event
can be received in the form of a flipping motion

0 (i.e. a short stroke) across the second hot spot
portion 178.

FIG. 5 is an illustration of a library screen
displayed using an embodiment of the electronic book.
In a preferred embodiment, the library screen is
5 displayed upon opening the electronic book or
activating the electronic book. The library screen
includes a rearward graphical book representation 200
having a graphical spine portion 202. A forward
graphical book representation 204 is displayed in
10 front of the rearward graphical book representation
200. The forward graphical book representation 204
has a graphical spine portion 206 and a graphical
front cover portion 208. A title 210 of a book
currently being read is displayed on the forward
15 graphical book representation 204. In the embodiment
illustrated in FIG. 5, the title 210 is displayed on
the graphical spine portion 206 of the forward
graphical book representation 204.

Upon receiving a user-initiated event in which a
20 portion of the rearward graphical book representation
200 is selected, a title of another book or books of
a plurality of books in a library is displayed in
place of the title 210 on the forward graphical book
representation 204. In a preferred embodiment, the
25 portion of the rearward graphical book representation
200 selected in this user-initiated event is within
the graphical spine portion 202.

The titles of the books in the library can be
obtained from a storage medium (which contains the
30 books) installed in the electronic book.
Alternatively, the titles of the books can be
obtained by a connection to an information service
providing books or other information in real time.

0 As another alternative, the titles and the books can be accessed on demand from a world-wide web page.

A user can scroll through the library of books by repeatedly touching the spine portion 202 with his or her finger 212 until a desired book title is
5 pulled into view. When the spine portion 202 is selected for a last of the plurality of books, the title of the first book is displayed. In this manner, the user can rotate through the library of books until a desired book is in front.

10 FIG. 6 is an illustration of a user-initiated event to open the desired book from the library screen. The forward book is opened upon receiving a user-initiated event in which a portion of the forward graphical book representation 204 is
15 selected. This user-initiated event can include, for example, the user touching the front cover portion 208 of the forward graphical book representation 204 using his or her finger 212. In response to this user-initiated event, the book indicated by a title
20 214 is opened. If the book is previously unread, the book is opened to page one. If the book has been read before, the book opens to a page which was last read.

FIG. 7 is an illustration of a first page of a
25 book displayed on the touchscreen 130 upon exiting the library screen. To display the first page of the book, the machine-readable data representative of text and graphics from the book is read from either the removable machine-readable storage medium 136
30 installed in the electronic book, or from the internal machine-readable storage medium 154. Upon reading the machine-readable data, a page of the text and/or the graphics is then displayed on the

0 touchscreen 130. As shown, the text is displayed to appear as a standard page in a real book.

If a user-initiated event is received in which a user selects the second hot spot portion 178, i.e. the page back portion, of the touchscreen 130 when
5 the book is on the first page, then a title page containing system controls is displayed.

FIG. 8 is an illustration of a title page of a book displayed on an embodiment of the electronic book. Information which is displayed on the title
10 page includes a book title 220, author information 222, copyright information 224, a Library of Congress number 226, and publisher information 228. Also displayed are statistics such as a total number of pages 230 in the book, a number of pages left to be
15 read 232, and an elapsed reading time 234.

A number of control options are also displayed. These control options include, but are not limited to, a pacing control option 236, a font selection option 238, a system control option 240, a read-to-me
20 option 242, and a radio frequency (RF) link option 244. Any of these control options can be initiated by a respective user-initiated event indicative of a user selecting the option. As illustrated in FIG. 8, a user is initiating a font selection routine by
25 touching the font selection option 238 using his or her finger 212.

FIG. 9 is an illustration of a font selection page displayed on an embodiment of the electronic book. The font selection page is displayed upon an
30 initiation of the font selection routine.

Displayed on the font selection page are a number of font/size combination options. Each option is in the form of a word displayed using a specific font and a specific size in accordance with the

0 font/size combination. A user selects a desired
font/size combination by viewing how words appear in
the various combinations, and selecting the
combination which is desired. For example, in FIG.
9, the user is selecting a desired font/size
5 combination by selecting a word 250 displayed in the
desired font/size combination using his or her finger
212.

The fonts can be selected from internal fonts
and custom fonts provided on the medium provided by a
10 publisher. For example, a user may select a Gothic
font provided on a medium containing a Shakespeare
work instead of default fonts (e.g. Courier,
Helvetica, Avant Garde) within the electronic book.

Upon selecting the desired font/size
15 combination, the electronic book automatically flips
back to the title page containing the system
controls. Thereafter, the electronic book uses the
desired font/size combination as a primary font/size
combination to display the text of the book. Titles
20 and headings in the book are enlarged and bolded
based upon the primary font/size combination. Other
portions of text can be italicized based on the
primary font. However, it is preferred that the body
of the text never be displayed smaller than the size
25 selected in the primary font/size combination. In
some embodiments, it may be preferred to display
footnotes in a size smaller than the size selected.

FIG. 10 is an illustration of the title page of
the book which is displayed upon exiting the font
30 selection page. Here, a user is shown to initiate a
system control routine by selecting the system
controls option 240 using his or her finger 212.

FIG. 11 is an illustration of a system control
page displayed in an embodiment of the electronic

0 book. The system control page is displayed upon
executing the system control routine.

The system control page provides a number of
display controls including a contrast control 254, a
tint control 256, and a color control 258. Each of
5 these controls provides a discrete number of control
values which can be directly selected by a user.
Further, each control value is displayed in a
graphical manner consistent with the result of its
selection. For example, the contrast control 254
10 includes a high contrast graphical representation
262, an intermediate contrast graphical
representation 264, and a low contrast graphical
representation 266. The graphical representations
262, 264, and 266 are of the same graphical image,
15 but are displayed using different contrast control
values. Hence, a user can visually determine a
desired contrast by viewing the graphical
representations 262, 264 and 266. In a similar
manner, the tint control 256 and the color control
20 258 each display a predetermined graphical image
using a discrete number of tint control values and
color control values, respectively.

Preferably, the display of the graphical
representations within the display controls are
25 unaffected by current values of selected ones of the
controls. In one preferred embodiment, the display
of the graphical representations is independent of
all of the current values. For example, the display
of the low contrast representation 266 can be
30 independent of the current contrast control value,
the current tint control value, and the current color
control value. In another preferred embodiment, the
display of the graphical representations in each
control is independent of the current value of that

0 control, but depend on the current value of the other
controls. Here, for example, the display of the low
contrast representation 266 is independent of the
current contrast control value, but dependent upon
the current tint control value and the current color
5 control value. Using either of these two
embodiments, a user can immediately determine a
result of each control value selection before
actually performing the selection.

The system control page also includes a sound
10 control 267. The sound control 267 is illustrated to
have a discrete number of sound intensity values
which can be selected by a user. In the embodiment
of FIG. 11, the sound intensity values are
monotonically related to the size of an ear displayed
15 on the sound control 267. An ear 268 having a slash
therethrough is indicative of an option to turn off
the sound. For the purpose of illustration, FIG. 11
shows a user selecting an intermediate sound
intensity by touching an ear graphic 269. The user
20 then returns to the system control page by touching
the second hot spot portion 178, i.e. the page back
hot spot, of the touchscreen 130.

It is noted that the controls on the system
control page can provide continuous, rather than
25 discrete, control of the control values in
alternative embodiments of the electronic book.
Here, for example, the ear size and the volume can
increase or decrease based on finger selection
movement.

30 A pad area 270 of the system control page is
utilized for testing motions such as a hold event, a
turn event, and a mark event. In particular, a user
can point to any of a hold selection 271, a turn
selection 272, and a mark selection 273, and then

0 perform the selected motion in the pad area 270.
Here, a length of hold time or style of dragging a
finger for a flip command can be gauged for each
user, for example, using the pad area 270.

FIG. 12 is an illustration of the title page of
5 the book which is displayed upon exiting the system
control page. Here, the user is illustrated to
select the read-to-me option 244 which initiates the
voice synthesizer 162 to audibly read the text being
visually displayed on the touchscreen 130. The
10 audible reading of the text begins at the last page
which was displayed on the touchscreen 130. The
reading rate and other controls for the read-to-me
routine is provided on a pacing control page
described hereinafter.

15 FIG. 13 is an illustration of the title page of
the book wherein a radio frequency link option is
selected. This option is selected by the user by
touching the RF link option 244 using his or her
finger 212. Upon selecting the RF link option 244,
20 an RF link routine is executed. The RF link routine
allows the user to download updates of the text to
the electronic book, and/or to interface the
electronic book to a personal computer or
communication unit. The RF link routine utilizes the
25 antenna 158 and the RF modem 160 illustrated in FIG.
3 to communicate with the personal computer using a
local wireless link, or more generally to communicate
with a wireless data communication network.
Utilizing a nationwide wireless data communication
30 network, such as the Ardis network, allows
individuals to receive book updates via radio
frequency links in major cities.

FIG. 14 is an illustration of the title page of
the book wherein a pacing control option is selected

0 by a user. Specifically, the user is shown to
initiate a pacing control routine by selecting the
pacing control option 236 displayed on the title page
using his or her finger 212.

FIG. 15 is an illustration of a pacing control
5 page displayed in an embodiment of the electronic
book. The pacing control page is displayed once the
user selects the pacing control option 236 from the
title page. The pacing control page includes a
display 280 of a current reading pace of the user.
10 Based upon the number of pages left in the book,
which is given in a display 282, a display 284 of an
estimated completion time for the book is also given.
In the embodiment of FIG. 15, the current reading
pace, the number of pages left, and the estimated
15 completion time are displayed in the form of one or
more sentences.

Also displayed on the pacing control page is a
display 290 of a desired reading pace. A display 292
of an estimated completion time in accordance with
20 the desired reading pace is also given. The desired
reading pace is controlled by the user using a
graphical slider bar 294. The pages of the text in
the book are automatically paced by a pacing routine
which is enabled and disabled by a graphical switch
25 296. In one embodiment, each page of text is
displayed for a duration commensurate with the
desired reading rate controlled by the graphical
slider bar 294. The user returns to the title page
from the pacing control page by selecting the second
30 hot spot portion 178, i.e. the page back portion, of
the touchscreen 130.

FIG. 16 is an illustration of the title page of
the book which depicts other user-initiated options.
The user can return to a book-marked page by

0 selecting the bookmark graphic 182. The user can
return to the library screen by selecting the fourth
hot spot portion 184, i.e. the close book portion, of
the touchscreen 130. The user can go to the first
page of the book by selecting the first hot spot
5 portion 170, i.e. the advance page portion, of the
touchscreen 130.

FIG. 17 is an illustration of a page marked by a
dog ear in an embodiment of the electronic book. The
user initiates a dog ear command by performing a
10 predetermined user-initiated event. An example of
such an event includes a user touching an upper
corner portion of the touchscreen 130, such as the
fifth hot spot portion 186 defined earlier.

If the page is not dog-eared, then a brief
15 touching of the upper corner portion 186 causes a dog
ear graphic 300 to be displayed in the upper corner
portion. In addition, an indication that this page
has been dog-eared is stored either in the removable
machine-readable storage medium 136 or the internal
20 machine-readable storage medium 154.

If the user touches the upper corner portion 186
of a page already marked with a dog ear, or if the
upper corner portion 186 is held for a duration
greater than a predetermined threshold, then a dog
25 ear dialog box is opened.

FIG. 18 is an illustration of a dog ear dialog
box used in embodiments of the electronic book. A
dog ear dialog box 302 is displayed on touchscreen
130. The dog ear dialog box 302 displays a list 304
30 of all dog-eared pages. A user can immediately go to
one of the dog-eared pages on the list 304 by
touching a display of a selected page number.

The dog ear dialog box 302 also displays an
option 306 to display marks 308 along an edge 310 of

0 the page. Thereafter, a user can touch any of the
marks 308 to move quickly to a corresponding one of
the dog-eared pages. In the example illustrated in
FIG. 18, a mark 312 corresponds to marked page 1, a
dog ear 314 corresponds to marked page 35, a mark 316
5 corresponds to marked page 94, a mark 318 corresponds
to marked page 111, and a mark 320 corresponds to
marked page 120. In a preferred embodiment, page one
is always marked with a dog ear so that a user can
quickly return thereto using either the marks 308 or
10 the dog ear dialog box 302.

Upon receiving a user-initiated event while the
dog ear dialog box 302 is displayed, the dog ear
dialog box 302 is removed to show the selected page
of the book.

15 FIG. 19 is an illustration of a user selecting a
portion of a page of text. A portion 330 is selected
by a user-initiated event of sliding his finger 212
(or other pointing member such as a stylus) from a
first position 332 to a second position 334. Upon
20 its selection, the portion 330 of the text is
highlighted in a predetermined manner. The portion
330 of the text can be highlighted in color if the
touchscreen 130 is capable of a color display.
Alternatively, the portion 330 of the text can be
25 highlighted using grey scale shading, reverse video,
or underlining. An option selection dialog box is
then displayed on the touchscreen 130 to provide the
user a number of text marking options.

FIG. 20 is an illustration of an option
30 selection dialog box used in embodiments of the
electronic book. An option selection dialog box 340
is displayed on the touchscreen 130 in a location out
of the way of the portion 330 of the text that is
marked when possible. The option selection dialog

0 box 340 includes a plurality of text marking options including a note capture option 342, a highlighting option 344, a quote capture option 346, and a set bookmark option 348.

5 Briefly, the note capture option 342 allows a user to type in notes associated with the portion 330 of the text. The highlighting option 344 leaves the portion 330 of the text highlighted, and stores an indication of this highlighting so that any subsequent return to this page displays the portion
10 330 as being highlighted. The quote capture option 346 allows a user to store the portion 330 of the text along with source data, such as the name of the author of the book or the title of the book, in the internal machine-readable storage medium 154. The
15 set bookmark option 348 can be selected to add a bookmark to the current page. If the page already has a bookmark, then a number of bookmark management options similar to options used for the dog ear command are provided to the user.

20 FIG. 21 is an illustration of an annotation display used in embodiments of the electronic book. The annotation display is provided in response to a user selecting the note capture option 342 illustrated in FIG. 20. After receiving a user-
25 initiated event indicative of selecting the note capture option 342, a soft keyboard 360 is displayed on the touchscreen 130. The soft keyboard 360 includes alphanumeric keys and symbolic keys along with a close key and a notes collection key.

30 A plurality of keystroke events are received by the soft keyboard 360 to form an annotation. As the keystroke events are received, a plurality of characters corresponding thereto are displayed in a window 362 on the touchscreen 130.

0 The user selects the close key on the soft
keyboard 360 upon completing the annotation. In
response to selecting the close key, the electronic
book removes the soft keyboard 360 and the window 362
from the touchscreen 130 and displays a note marker
5 icon to indicate that the page has an annotation
associated therewith.

 The notes collection key on the soft keyboard
360 commands the electronic book to communicate the
annotation to an external device such as a personal
10 computer. The personal computer can be interfaced to
the electronic book either wirelessly via the antenna
158 and the radio frequency modem 160 shown in FIG.
3, using a wire-based connection via the data
interface 156, or using an infrared link.

15 An annotation can also be in the form of an
image of pixels which overlays the page of the text.
The pixels can be drawn on the touchscreen 130 using
a pointing device. The pixels can be stored in a
pixel-map form for subsequent viewing or for
20 subsequent conversion to text using a handwriting
recognition method.

 As another option, an accessory keyboard can be
added to the electronic book to enter the annotation
as well as other information.

25 FIG. 22 is an illustration of a marker used to
indicate that a page has an annotation associated
therewith. The page illustrated in FIG. 22 results
after the user enters the annotation and selects the
close key from the soft keyboard 360 as illustrated
in FIG. 21. As shown, the page in FIG. 22 no longer
30 has the soft keyboard 360 and the window 362
displayed thereon. However, a note marker icon 370
is displayed in a lower corner of the page. The user
can view the annotation associated with this page by

0 selecting the note marker icon 370. Selecting the
note marker icon 370 has the same effect as selecting
the note capture option 342 as shown in FIG. 20.

Further, an annotation can be indicated by
underlining or highlighting the portion of the text
5 associated with the annotation. The annotation can
be viewed in a hypertext-type manner by selecting the
portion of text.

FIG. 23 is an illustration of a user selecting a
set bookmark option in the option selection dialog
10 box. The user selects the set bookmark option 348 by
touching the displayed text associated therewith
using his or her finger 212 or other pointing member.
If this page had already included a bookmark, then a
bookmark management dialog box is displayed similar
15 to the one used for the dog ear command. Since the
page illustrated in FIG. 23 does not have a bookmark
associated therewith, the selection of the set
bookmark option 348 causes a bookmark to be added to
the page. In a preferred embodiment, only one page
20 is bookmarked within each book.

FIG. 24 is an illustration of the page of FIG.
23 having a bookmark displayed thereon. A bookmark
icon 380 is displayed in an upper portion of the page
to indicate that the page has been bookmarked.

25 It is noted that pointing devices other than an
individual's finger may be utilized to generate user-
initiated events indicative of desired selections
using the touchscreen 130. For example, a stylus or
the like can be utilized to select desired portions
30 of the touchscreen 130.

It is also noted that various types of graphical
controls can be utilized to control settings and
parameters of the electronic book. These graphical
controls include, but are not limited to, graphical

0 buttons, checkboxes, radio buttons, scroll bars,
slider bars, pop-up menus, and dialog boxes.

Next, a description of steps which are performed
by the various components of the electronic book to
provide its features and functionality is presented.

5 These operational steps are performed on or with the
aid of the processor 152 illustrated in FIG. 3. The
processor 152 is directed to function in a manner in
accordance with these operational steps based upon a
computer program or other form of software or
10 firmware stored in a computer readable memory. The
computer readable memory can be contained with the
processor 152, within the internal machine-readable
memory 154, or within a separate machine-readable
storage medium in communication with the processor
15 152.

It is noted that the order in which the steps
are described are indicative of one embodiment of the
present invention, and that alternative embodiments
of the present invention may perform the steps in a
20 different order to achieve the same functionality.

FIG. 25 is a flow diagram of an event loop
performed in an embodiment of the electronic book.
As indicated by block 400, a step of executing a
library graphical user interface routine is
25 performed. The library graphical user interface
routine provides a virtual library to allow a user to
select a book to read from a plurality of books
within a library, and/or access an information
service or world-wide web page as previously
30 described. The plurality of books can be contained
in one or more removable machine-readable storage
media and/or the internal machine-readable storage
medium.

- 0 Upon selecting a desired book, a step of
executing a routine to display one or more pages of
text and graphics from the desired book is performed
as indicated by block 402. The routine to display
the pages of text is executed until a predetermined
5 user-initiated event is received to exit the routine.
As indicated by block 404, if a close book event is
received, then flow of the event loop is directed
back to the step of executing the library graphical
user interface routine in block 400.
- 10 If a page back event is received when the
current page of text being read is page one, then a
step of displaying a title page of the book is
performed as indicated by block 406. The title page
provides a number of control options available to a
15 user. The user selects a desired control option
based upon a user-initiated event. Block 408
indicates a step of receiving this user-initiated
event.
- 20 Based upon the user-initiated event which is
received, flow of the event loop is directed to one
of a number of subroutines in a step indicated by
block 410. If the received event is indicative of
the user selecting the pacing control option, then a
step of executing a pacing control routine is
25 performed as indicated by block 412. If the received
event is indicative of the user selecting the font
selection option, then a step of executing a font
selection routine is performed as indicated by block
414. If the received event is indicative of the user
30 selecting the system control option, then a step of
executing a system control subroutine is performed as
indicated by block 416. If the received event is
indicative of the user selecting the RF link option,
then a step of executing an RF link subroutine is

0 performed as indicated by block 420. Upon completing
either the pacing control subroutine, the font
selection routine, the system control routine, or the
RF link routine, flow of the event loop is directed
back up to block 406 wherein the step of displaying
5 the title page is performed.

If the received event from block 408 is
indicative of the user selecting the read-to-me
option, then a step of executing a read-to-me routine
is performed as indicated by block 422. Flow of the
10 event loop is then directed back to block 402 to
execute the routine to display pages of text from the
book. The execution of the read-to-me routine in
block 422 provides a spoken, auditory display of the
text in addition to the visual display of the text in
15 block 402.

If the event received in the step of block 408
is an advance page event, then a step of setting the
current page to page one is performed as indicated by
block 424. If the received event is indicative of
20 the user selecting a bookmark displayed on the title
page, then a step of setting the current page to a
previously bookmarked page is performed as indicated
by block 426. After the current page is set in
either of the steps indicated by blocks 424 and 426,
25 then flow of the event loop is directed back to the
step of executing the routine to display pages of
text indicated by block 402.

Finally, if the event received in block 408 is
indicative of a close book event, then flow of the
30 event loop is directed back to block 400 to perform a
step of executing the library graphical user
interface routine.

FIG. 26 is a flow diagram of steps performed in
an embodiment of a library graphical user interface

0 routine for use in the electronic book. These steps
can be performed in executing the library graphical
user interface routine indicated by block 400 in FIG.
25. The steps provide a method of selecting a book
for reading in an electronic book where the book is
5 selected from a plurality of books in a library.

As indicated by block 430, a step of displaying
a rearward graphical book representation having a
graphical spine portion is performed. A step of
displaying a forward graphical book representation in
10 front of the rearward graphical book representation
is performed as indicated by block 432. The forward
graphical book representation has a graphical spine
portion and a graphical front cover portion.

As indicated by block 434, a step of displaying
15 a title of a first book of the plurality of books on
the forward graphical book representation is
performed. The title of the first book can be
displayed anywhere on the forward graphical book
representation. However, in a preferred embodiment,
20 the title of the first book is displayed on the
graphical spine portion of the forward graphical book
representation. FIG. 5 illustrates an example of the
rearward graphical book representation 200 having the
graphical spine portion 202, the forward graphical
25 book representation 204 having the graphical spine
portion 206 and the graphical front cover portion
208, and the title 210 displayed on the forward
graphical book representation 204.

With reference again to FIG. 26, a step of
30 receiving a first user-initiated event in which a
portion of the rearward graphical book representation
is selected is performed as indicated by block 436.
In a preferred embodiment, the portion of the
rearward graphical book representation selected in

- 0 this step is within the graphical spine portion of the rearward graphical book representation. Upon receiving the first user-initiated event, a step of displaying a title of a second book of the plurality of books is performed as indicated by block 440.
- 5 Preferably, the title of the second book is displayed in place of the title of the first book on the graphical spine portion of the forward graphical book representation.

- As indicated by block 442, a step is performed
- 10 of receiving a second user-initiated event in which a portion of the forward graphical book representation is selected. In a preferred embodiment, the portion of the forward graphical book representation selected in this step is within the front cover portion of the
- 15 forward graphical book representation. The reception of the second user-initiated event ends the execution of the library graphical user interface routine, and flow is directed to the routine to display pages of text from the second book. Here, steps are performed
- 20 of reading machine-readable data from a machine-readable storage medium installed in the electronic book, the machine-readable data being representative of text from the second book, and displaying the text represented by the machine-readable data.

- 25 It is noted that the steps indicated by blocks 436 and 440 can be repeated to allow the user to rotate through the plurality of books. When the first user-initiated event is received while a last of the plurality of books is displayed, the next
- 30 title displayed is that of the first of the plurality of books.

It is preferred that steps of displaying and receiving user-initiated events all be performed using the touchscreen 130 integrated in the

0 electronic book. However, in alternative embodiments of the electronic book which include a series of buttons external to the touchscreen 130, any of the above-described user-initiated events may be received using these buttons.

5 FIGS. 27 and 28 show flow diagrams of an embodiment of the routine to display pages of text in the electronic book. The steps indicated in these flow diagrams are performed in one embodiment of the step indicated by block 402 in FIG. 25.

10 Upon entering the routine, a step of displaying a current page of the book is performed as indicated by block 450. The current page includes text from the current page of the book, a graphical display of a number of pages remaining in the book, a display of a bookmark graphic if there is a bookmark associated
15 with the current page, a dog ear graphic if the current page is dog-eared, and a note marker icon if there is an annotation associated with the current page. Optionally, the current page includes graphics
20 from the current page of the book.

After displaying the current page, a branching step is performed, as indicated by block 452, based upon any user-initiated events which are received. If a user-initiated event is received which selects a
25 portion of the text, a step of marking the portion of the text is performed as indicated by block 454. The portion of the text can be marked either by color or grey scale highlighting the portion of the text, underlining the portion of the text, or displaying
30 the portion of the text in a reverse video form. The portion of the text can be selected directly by a user sliding a finger or a stylus over the portion of the text. Alternatively, the portion of the text can be selected indirectly by a menu selection technique.

0 After the portion of the text has been marked, a
step of displaying an option selection dialog box is
performed as indicated by block 456. The option
selection dialog box provides a plurality of options
to the user, including a note capture option, a
5 highlighting option, a quote capture option, and a
set bookmark option.

As indicated by block 460, a step of receiving a
user-initiated event indicative of a selection of one
of the options is performed. Based upon the
10 selection, a branching step is performed as indicated
by block 462. If the note capture option is
selected, then a step of executing an annotation
subroutine is performed as indicated by block 464.
If the quote capture option is selected, then a step
15 of executing a quote capture subroutine is performed
as indicated by block 466. If the highlighting
option is selected, then a step of executing a
highlighting subroutine is performed as indicated by
block 470. If the set bookmark option is selected,
20 then a step of executing a bookmark subroutine is
performed as indicated by block 472.

Upon completing the execution of either the
annotation subroutine, the quote capture subroutine,
the highlighting subroutine, or the bookmark
25 subroutine, a step of determining whether a pacing
mode is active is performed as indicated by block
474. If the pacing mode is inactive, then flow of
the routine is directed back to block 452 which
performs a branching step based upon a received user-
30 initiated event. If the pacing mode is active, then
a step of determining whether a highlighting mode is
active is performed as indicated by block 476. If
the highlighting mode is active then a step of
scrolling a highlight across the current page is

0 performed as indicated by block 480. Scrolling the highlight across the current page allows pacing of a user's scanning across the current page. A user can activate the highlighting mode to help enhance his or her reading speed.

5 The highlight which is scrolled across the page can be in the form of either a color or grey scale highlight, an underlining of text, or a reverse video form of text. If the touchscreen 130 is capable of selective backlighting, then the highlight can be in
10 the form of a selective backlighting of a reduced portion of the touchscreen 130.

After scrolling the highlight across the current page in block 480 or if the highlighting mode is inactive, then a step of determining whether it is
15 time for displaying a subsequent page is performed as indicated by block 482. If the time has not yet come for displaying a subsequent page, then flow is directed back to block 452. If the time has arrived for displaying a subsequent page, then a step of
20 updating the current page is performed as indicated by block 484. Next, a step of displaying a forward page turn in an animated matter is performed as indicated by block 486. This step includes displaying an animated sequence of images which
25 simulates a forward flipping of a page. Flow of the routine is then directed back to block 450 to display the new current page.

With reference to block 452, if a user-initiated event is received indicative of the user selecting
30 the note marker icon, then the step of executing the annotation routine indicated by block 464 is performed. Thereafter, subsequent steps are performed beginning with the step indicated by block 474.

0 With reference to the branching step performed
in block 452, if a dog ear user-initiated event is
received, then a step of executing a dog ear routine
is performed as indicated by block 490. If the user-
initiated event is indicative of the user selecting
5 the bookmark portion of the page, then a step of
executing a bookmark management routine is performed
as indicated by block 491. Thereafter, subsequent
steps are performed beginning with the step indicated
by block 474. Similarly, if no user-initiated events
10 are received in block 452, then flow of the routine
is directed to the step indicated by block 474.

 If the user-initiated event is indicative of the
user selecting the page back portion of the page,
then flow from block 452 branches to a step of
15 decrementing the current page as indicated by block
492. Further, a step of displaying a backward page
turn in an animated matter is performed as indicated
by block 494. This step includes displaying an
animated sequence of images which simulates a
20 backward flipping of a page. The steps indicated by
blocks 486 and 494 give the user the sense or feel
that a page of information is being turned in place,
carrying forward the familiar paradigm of turning the
page on a standard paper book.

25 As indicated by block 496, a step of determining
whether the new current page is the title page is
performed after the step of block 494. If the new
current page is the title page, then execution of the
routine to display pages of text in the electronic
30 book is completed as indicated by block 500. If the
new current page is any page but the title page, then
flow of the routine is directed back to block 450
wherein a step of displaying the new current page is
performed.

0 If the user-initiated event is indicative of the
user selecting the advance page portion of the page,
then flow is directed from the step indicated by
block 452 to a step of incrementing the current page
as indicated by block 502. Further, a step of
5 displaying a forward page turn in an animated matter
is performed is indicated by block 504. Flow of the
routine is then directed back to block 450 wherein
the new, incremented current page is displayed.

FIG. 29 is a flow diagram of steps performed to
10 display a current page in the electronic book. These
steps constitute one embodiment of a method of
performing the step indicated by block 450 in FIG.
27.

As indicated by block 510, a step of displaying
15 text from the current page of the book is performed.
The text is displayed in accordance with a primary
font parameter and a primary size parameter. If
there is any highlighting associated with a portion
of the text on the current page, then a step of
20 displaying the portion of the text in a highlighted
manner is performed as indicated by block 512. If
any graphical information is included in the current
page, then a step of displaying the graphical
information is performed as indicated by block 513.

25 As indicated by block 514, a step of graphically
displaying a number of pages remaining in the book is
performed. The number of pages remaining in the book
can be displayed in the sixth portion 188 of the
touchscreen 130 as illustrated in FIG. 4. The number
30 of pages remaining in the book can be graphically
displayed using either an image of a number of pages,
a dark line as a drop shadow, or a group of parallel
lines to indicate relative depth by page number in a
given document. When the current page is one of the

0 early pages in the book, the drop shadow or graphical
image depth is relatively deep, indicating that there
is a significant portion of the book remaining to be
read. When the current page is near the middle of
the book, the drop shadow or graphical image depth is
5 half as deep. When nearing the end of the book, the
drop shadow or graphical image depth becomes very
thin indicating that the reader is almost at the end
of the book. As a result, the user can determine at
a glance how much of the book has been read, and
10 their relative position within the book just as a
standard paper book. As an alternative to using a
top portion of the touchscreen for graphically
displaying the number of pages remaining in the book,
a side edge and/or a bottom edge of the touchscreen
15 130 can be utilized to provide this graphical
display.

As indicated by block 516, a step of determining
if a bookmark is associated with the current page is
performed. If a bookmark is associated with the
20 current page, then a step of displaying a bookmark
graphic is performed as indicated by block 520.

As indicated by block 522, a step of determining
if the current page is dog-eared is performed. If
the current page is dog-eared, then a step of
25 displaying a dog ear graphic is performed as
indicated by block 524.

As indicated by block 526, a step of determining
whether an annotation exists for the current page is
performed. If there is an annotation associated with
30 the current page, then a step of displaying a note
marker icon is performed as indicated by block 530.

FIG. 30 is a flow diagram of steps performed in
an embodiment of an annotation routine. Such an

0 annotation routine is executed in the step indicated
by block 464 in FIG. 28.

As indicated by block 540, a step of displaying
a window for displaying the annotation is performed.
As indicated by block 542, a step of displaying a
5 soft keyboard on the touchscreen 130 is performed.
The soft keyboard is provided to receive a plurality
of keystroke events to form the annotation.

After displaying the soft keyboard and the
annotation window, a step of receiving a keystroke
10 event is performed as indicated by block 544. As
indicated by block 546, a branching operation is
performed based upon the keystroke event received in
block 544. If the keystroke event is indicative of
the user selecting either an alphanumeric key or a
15 symbolic key on the soft keyboard, then a step of
displaying a character associated with the key is
performed as indicated by block 560. The character
associated with the key is displayed within the
annotation window. After displaying the character,
20 flow of the routine is directed back to block 544
wherein a subsequent keystroke event is received.

Referring back to the branching step indicated
by block 546, if the keystroke event is indicative of
a user selecting the close key from the soft
25 keyboard, then a step of closing the soft keyboard is
performed as indicated by block 562. A step of
closing the annotation window is also performed, as
indicated by block 564. As indicated by block 566, a
step of displaying a note marker icon on the page is
30 performed. Thereafter, execution of the annotation
subroutine is completed.

With reference again to the branching step
performed in block 546, if the keystroke event is
indicative of the user selecting the notes collection

0 key, then a step of communicating the annotation to
an external personal computer is performed as
indicated by block 570. After communicating the
annotation to the personal computer, flow of the
routine is directed back to block 544 wherein a
5 subsequent keystroke event is received.

FIG. 31 is a flow diagram of steps performed in
an embodiment of a quote capture subroutine. Such a
quote capture subroutine can be performed to provide
the step indicated by block 466 in FIG. 28.

10 Prior to entering the quote capture subroutine,
a user-initiated event was received in the electronic
book which selects a portion of the text displayed on
the touchscreen. After receiving the user-initiated
event, a plurality of text marking options, including
15 a quote capture option, is displayed, and a user-
initiated event indicative of a user selecting the
quote capture option is received.

As indicated by block 580, a step of storing
quote data representative of the portion of the text
20 is performed. The quote data is stored in the
internal machine-readable storage medium 154
illustrated in FIG. 3.

As indicated by block 582, a step of storing
source data which identifies the source of the quote
25 data is performed. The source data can be
representative of the author of the book, the title
of the book, a copyright date of the book, and/or a
publisher of the book. The source data is stored in
the internal machine-readable storage medium 154 from
30 FIG. 3.

As indicated by block 584, a step is performed
of maintaining the quote data and the source data in
the internal machine-readable storage medium when the
removable machine-readable storage medium is removed

0 from the electronic book. As a result of this step,
subsequent steps can be performed based upon the
quote data and the source data when the removable
machine-readable storage medium is removed.
Specifically, a step of retrieving the quote data and
5 the source data from the internal machine-readable
storage medium can be performed when the removable
machine-readable storage medium is removed from the
electronic book. Thereafter, a step of displaying
the portion of the text represented by the quote data
10 and source information represented by the source data
can be performed.

It is noted that limits on the ability to
download quotes can be set within the machine-
readable storage medium containing the book. The
15 limits can be in the form of software keys which are
set, for example, by a copyright holder of the book.

FIG. 32 is a flow diagram of steps performed in
an embodiment of a dog ear subroutine. Such a dog
ear subroutine is executed in the step indicated by
20 block 490 in FIG. 27.

As indicated by block 590, a step is performed
of determining a duration in which a dog ear portion
of the touchscreen is held. A step of comparing the
duration to a predetermined threshold is performed as
25 indicated by block 592. The predetermined threshold
can be about a second. If the duration is less than
the predetermined threshold, then a step of
determining whether the current page has a dog ear is
performed as indicated by block 594. If the current
30 page does not have a dog ear, then a step of storing
an indication that the current page be dog-eared is
performed as indicated by block 596. Further, a step
of displaying a dog ear graphic in an upper corner
portion of the touchscreen 130 is performed as

0 indicated by block 600. Thereafter, execution of the dog ear subroutine is completed.

With reference to blocks 592 and 594, if the duration is greater than or equal to the predetermined threshold or if the current page is
5 already dog-eared, then a step of displaying a dog-eared dialog box is performed as indicated by block 602. Within the dog-eared dialog box, a list of all marked pages is displayed. Further, an option to show marks corresponding to all of the marked pages
10 along an edge of each page is displayed.

As indicated by block 604, a user-initiated event is received. As indicated by block 606, a branching step is performed based upon the user-initiated event received. If the user-initiated
15 event is indicative of a user selecting a page number from the list of marked pages, then a step of setting the current page to the selected page number is performed as indicated by block 610. If the user-initiated event is indicative of the user selecting
20 the marking option, then a step of displaying marks corresponding to the dog-eared pages along an edge of the page is performed as indicated by block 612.

FIG. 33 is a flow diagram of steps performed in an embodiment of a pacing control subroutine. The
25 pacing control subroutine is executed in the step indicated by block 472 in FIG. 25.

As indicated by block 620, a step of determining a number of pages remaining in the book is performed. As indicated by block 622, a step of determining a
30 current reading pace of the user is performed.

Based upon the number of pages remaining in the book, a step of calculating one or more estimated completion times is performed as indicated by block 624. A first estimated completion time can be

0 calculated by dividing the number of words or pages
 remaining in the book by the current reading pace of
 the user. As a result, the first estimated
 completion time estimates how long it would take the
 user to complete the book at his or her current
5 reading pace. A second estimated completion time is
 calculated by dividing the number of words or pages
 remaining in the book by a desired reading pace. The
 second estimated completion time estimates how long
 it would take the user to complete the book at the
10 desired reading pace.

 As indicated by block 626, a step of displaying
 each estimated completion time is performed. Each
 estimated completion time can be displayed within a
 corresponding sentence as illustrated in FIG. 15.

15 As indicated by block 630, a step of calculating
 a necessary reading pace to satisfy a predetermined
 reading goal is performed. The predetermined reading
 goal can be in the form of a time duration within
 which a user wishes to complete the pages remaining
20 in the book. Here, the necessary reading pace is
 calculated by dividing the number of pages remaining
 in the book by the time duration. A step of
 displaying the necessary reading pace to satisfy the
 reading goal is then performed as indicated by block
25 632.

 As indicated by block 634, a step of displaying
 one or more graphical pacing controls is performed.
 As illustrated in FIG. 15, the one or more graphical
 pacing controls can include a graphical slider bar
30 such as the graphical slider bar 294 used for
 modifying the desired reading pace, and a graphical
 switch such as the graphical switch 296 which is used
 for enabling and disabling an automatic pacing of the
 text using a pacing routine.

0 As indicated by block 636, a user-initiated
event is received. As indicated by block 640, if the
user-initiated event is indicative of the user
selecting the page back portion of the touchscreen
130, then execution of the pacing control subroutine
5 is terminated. Upon terminating the pacing control
subroutine, the system control page is displayed on
the touchscreen 130.

 If the user-initiated event is not indicative of
the user selecting the page back portion, then a step
10 of updating a pacing parameter based on the user-
initiated event is performed as indicated by block
642. Examples of the pacing parameter include the
desired reading pace and the reading goal. After
updating the pacing parameter, flow of the subroutine
15 is directed back to block 624 to recalculate an
estimated completion time and the necessary reading
pace.

 FIG. 34 is a flow diagram of steps performed in
an embodiment of the font selection subroutine. The
20 font selection subroutine is executed in block 414 in
the event loop of FIG. 25.

 As indicated by block 650, a step of displaying
a plurality of words using a corresponding plurality
of combinations of different fonts and different
25 sizes is performed. More specifically, each word is
displayed using a specific font and a specific size
in accordance with the combination corresponding
thereto. Optionally, the step of displaying the
plurality of words can include displaying a
30 respective font name for each of the combinations.
As another option, the step of displaying the
plurality of words can include displaying a single
textual expression using the corresponding plurality
of combinations.

0 As indicated by block 652, a step of receiving a user-initiated event indicative of the user selecting one word of the plurality of words is performed. This selection indicates which font/size combination is desired by the user.

5 As indicated by block 654, a step of updating a primary font parameter and a primary size parameter is performed. The primary font parameter and the primary size parameter are updated in accordance with the font/size combination selected by the user. As
10 indicated by block 656, a step of automatically returning to displaying the title page is performed after receiving the user-initiated event selecting the one word. Thereafter, a subsequent step of displaying text of a book includes displaying the
15 text using the primary font in a size at least the primary size.

FIG. 35 is a flow diagram of steps performed in an embodiment of the system control subroutine. The system control subroutine is executed in the step
20 indicated by block 416 in the event loop of FIG. 25.

As indicated by block 660, a step of displaying a plurality of graphical controls for setting system parameters is performed. The system parameters can include display parameters such as a contrast
25 parameter, a tint parameter, and a color parameter. The system parameters can also include a sound parameter.

As indicated by block 662, a step of receiving a user-initiated event is performed. If the user-
30 initiated event is indicative of the user selecting the page back portion of the touchscreen, as indicated by block 664, then execution of the system control subroutine is completed. For other user-

0 initiated events, a step of updating a system
parameter is performed as indicated by block 668.

Thus, there has been described herein a concept,
as well as several embodiments including preferred
embodiments of an electronic book and method of
5 capturing and storing a quote therein.

Because the various embodiments of the present
invention provide a quotable quotes feature in which
quote data representative of a portion of a book is
stored and maintained in an internal machine-readable
10 storage medium when a removable machine-readable
storage medium is removed from the electronic book,
they provide a significant improvement in that the
portion of the book can be recalled regardless of
whether the removable machine-readable storage medium
15 is installed.

Additionally, the various embodiments of the
present invention store and maintain source data
representative of the author and/or the title of the
book so that the user can identify the source of the
20 quote.

It will be apparent to those skilled in the art
that the disclosed invention may be modified in
numerous ways and may assume many embodiments other
than the preferred form specifically set out and
25 described above.

Accordingly, it is intended by the appended
claims to cover all modifications of the invention
which fall within the true spirit and scope of the
invention.

30 What is claimed is:

0

Claims

1. A method of capturing and storing a quote in an electronic book having a book-shaped housing, the method comprising the steps of:

- 5 (a) reading machine-readable data from a removable machine-readable storage medium installed in the electronic book, the machine-readable data representative of text from a book;
- (b) displaying the text represented by the
10 machine-readable data;
- (c) receiving a user-initiated event which selects a portion of the text;
- (d) storing quote data representative of the portion of the text in an internal machine-readable
15 storage medium within the electronic book;
- (e) storing source data representative of at least one of an author of the book and a title of the book in the internal machine-readable storage medium; and
- 20 (f) maintaining the quote data and the source data in the internal machine-readable storage medium when the removable machine-readable storage medium is removed from the electronic book.

- 25 2. The method of claim 1 further comprising the steps of:

- (g) retrieving the quote data and the source data from the internal machine-readable storage medium when the removable machine-readable storage
30 medium is removed from the electronic book; and
- (h) displaying the portion of the text and at least one of the author of the book and the title of the book represented by the quote data and the source data.

0

3. The method of claim 1 wherein the text is displayed on a touchscreen integrated in the electronic book, and wherein the user-initiated event includes a user sliding a finger over the portion of the text on the touchscreen.

5

4. The method of claim 1 further comprising the steps of:

after receiving the user-initiated event,
10 displaying a plurality of text marking options including a quote capture option; and
receiving a second user-initiated event indicative of a user selecting the quote capture option.

15

5. The method of claim 4 wherein the text and the plurality of text marking options are displayed on a touchscreen integrated in the electronic book, and wherein the second user-initiated event includes
20 a user touching a portion of the touchscreen associated with the quote capture option.

6. The method of claim 5 wherein the plurality of text marking options is displayed so that view of
25 the text is maintained.

- 0 7. An electronic book comprising:
- a book-shaped housing having a first housing member pivotably connected to a second housing member to facilitate opening and closing in a book-like manner;
- 5 an interface which receives a removable machine-readable storage medium containing machine-readable data representative of text from a book;
- a processor housed by the book-shaped housing and in communication with the interface, the
- 10 processor operative to read the machine-readable data from the removable machine-readable storage medium and to display the text represented by the machine-readable data;
- a touchscreen in communication with the
- 15 processor and integrated in the book-shaped housing to be accessible when the book-shaped housing is opened in the book-like manner, the touchscreen operative to display the text represented by the machine-readable data and to receive a user-initiated
- 20 event which selects a portion of the text; and
- an internal machine-readable storage medium in communication with the processor and at least partially contained within the book-shaped housing;
- wherein the processor stores quote data
- 25 representative of the portion of the text and source data representative of at least one of an author of the book and a title of the book in the internal machine-readable storage medium, and wherein the quote data and the source data are maintained in the
- 30 internal machine-readable storage medium when the removable machine-readable storage medium is removed from the electronic book.
8. The electronic book of claim 7 wherein the source data stored in the internal machine-readable

0 storage medium is representative of both the author
of the book and the title of the book.

9. The electronic book of claim 8 wherein the
source data stored in the internal machine-readable
5 storage medium further includes a copyright date of
the book.

10. The electronic book of claim 8 wherein the
source data stored in the internal machine-readable
10 storage medium further includes a publisher of the
book.

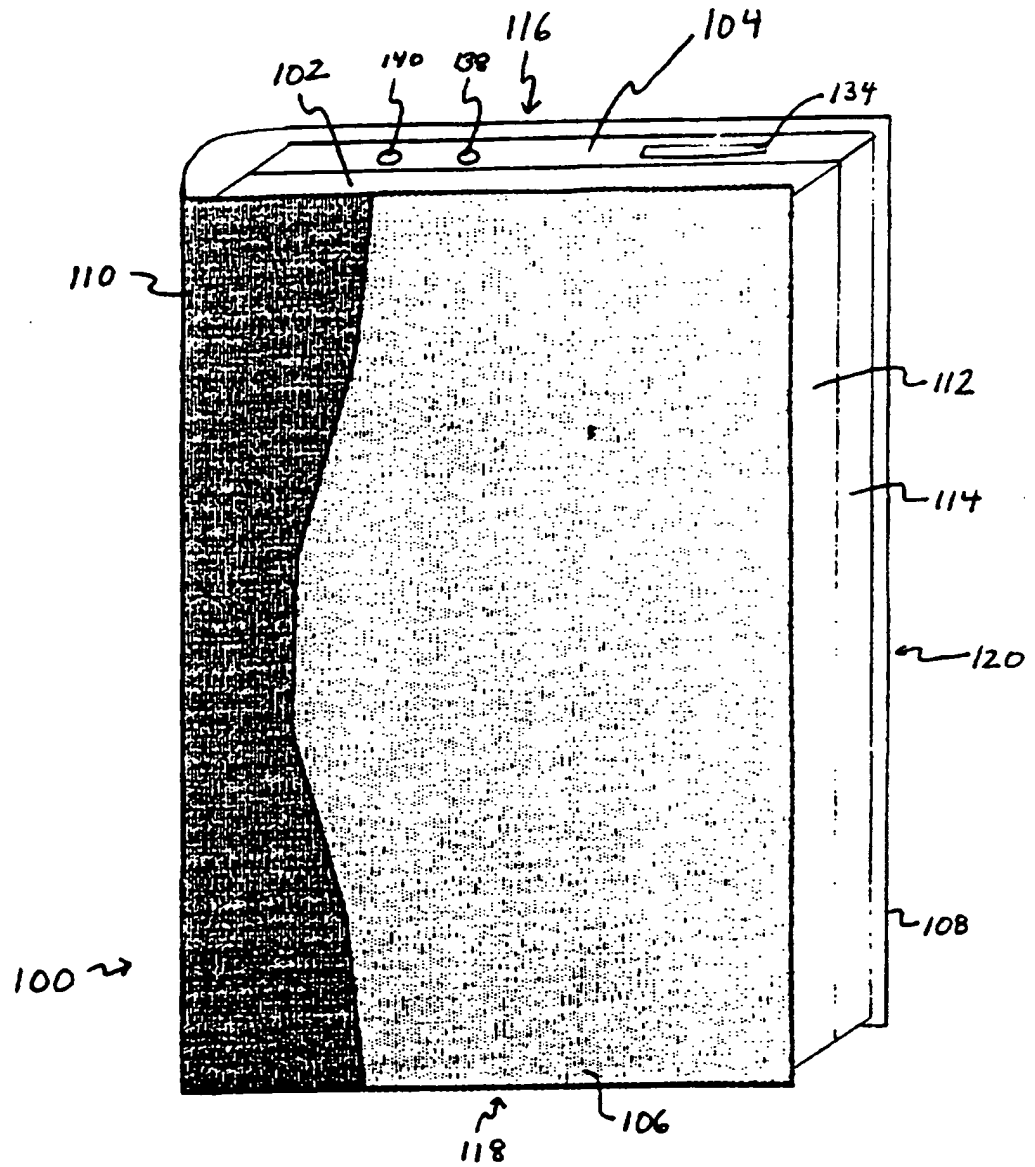


FIG. 1

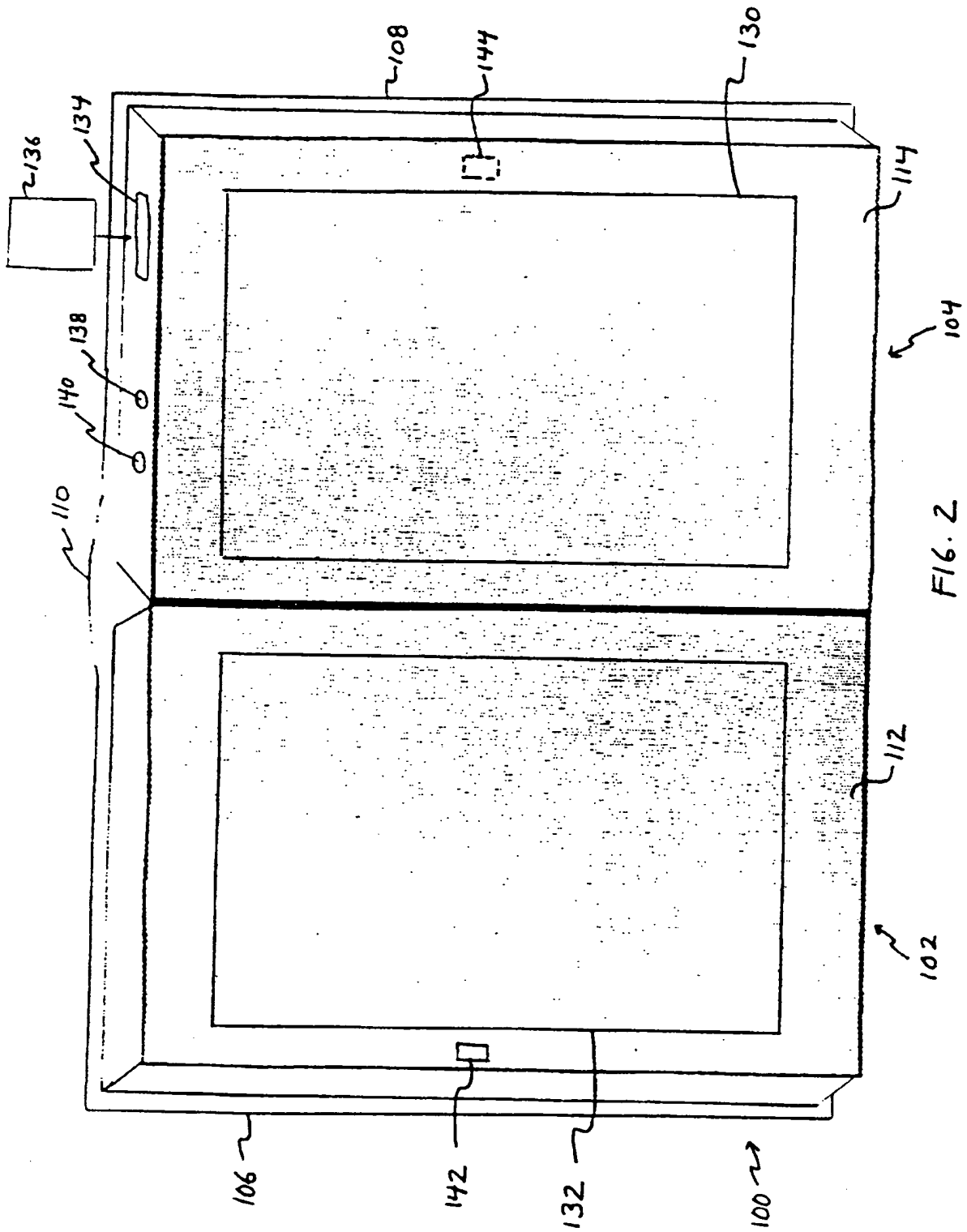


FIG. 2

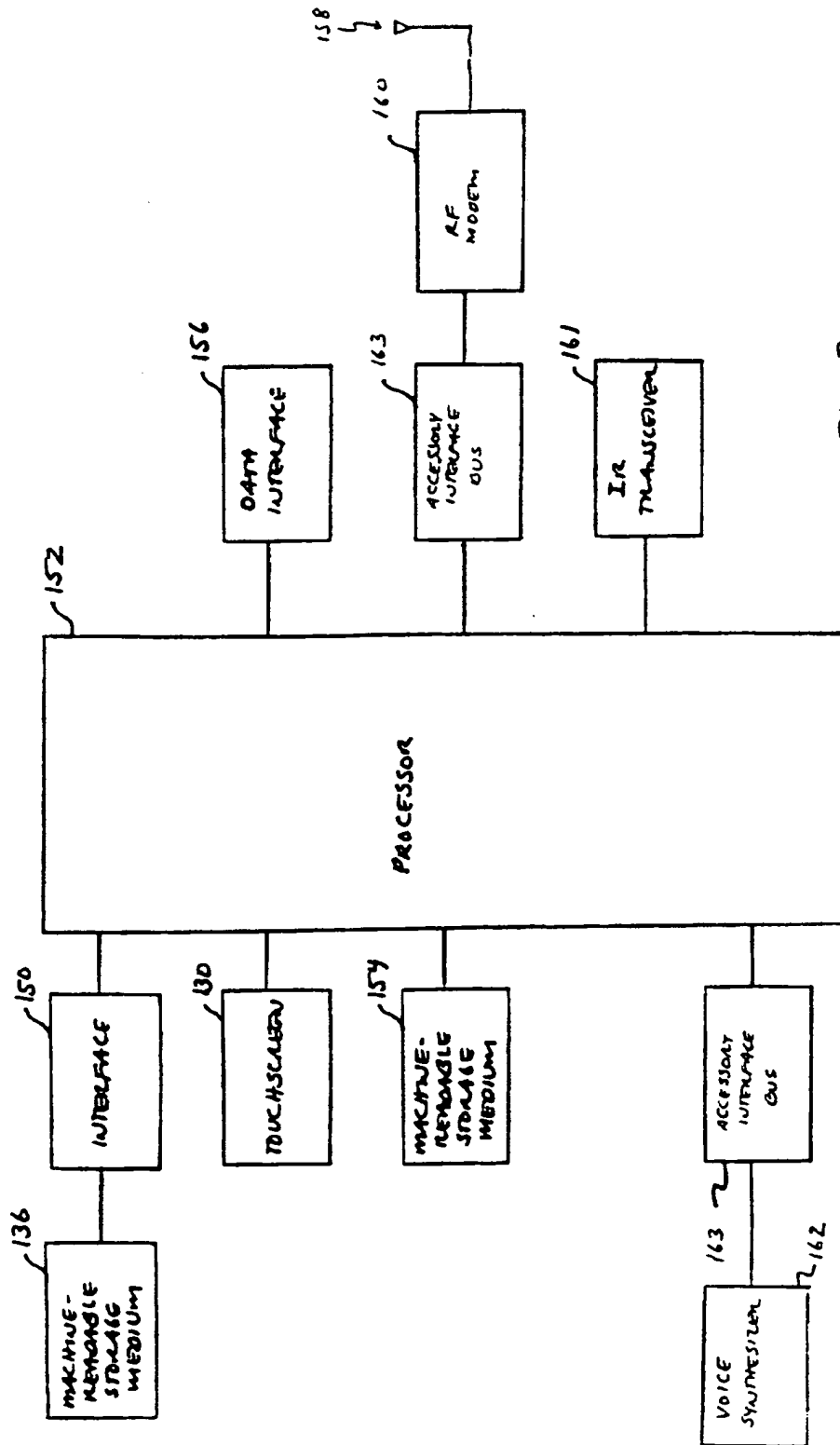


FIG. 3

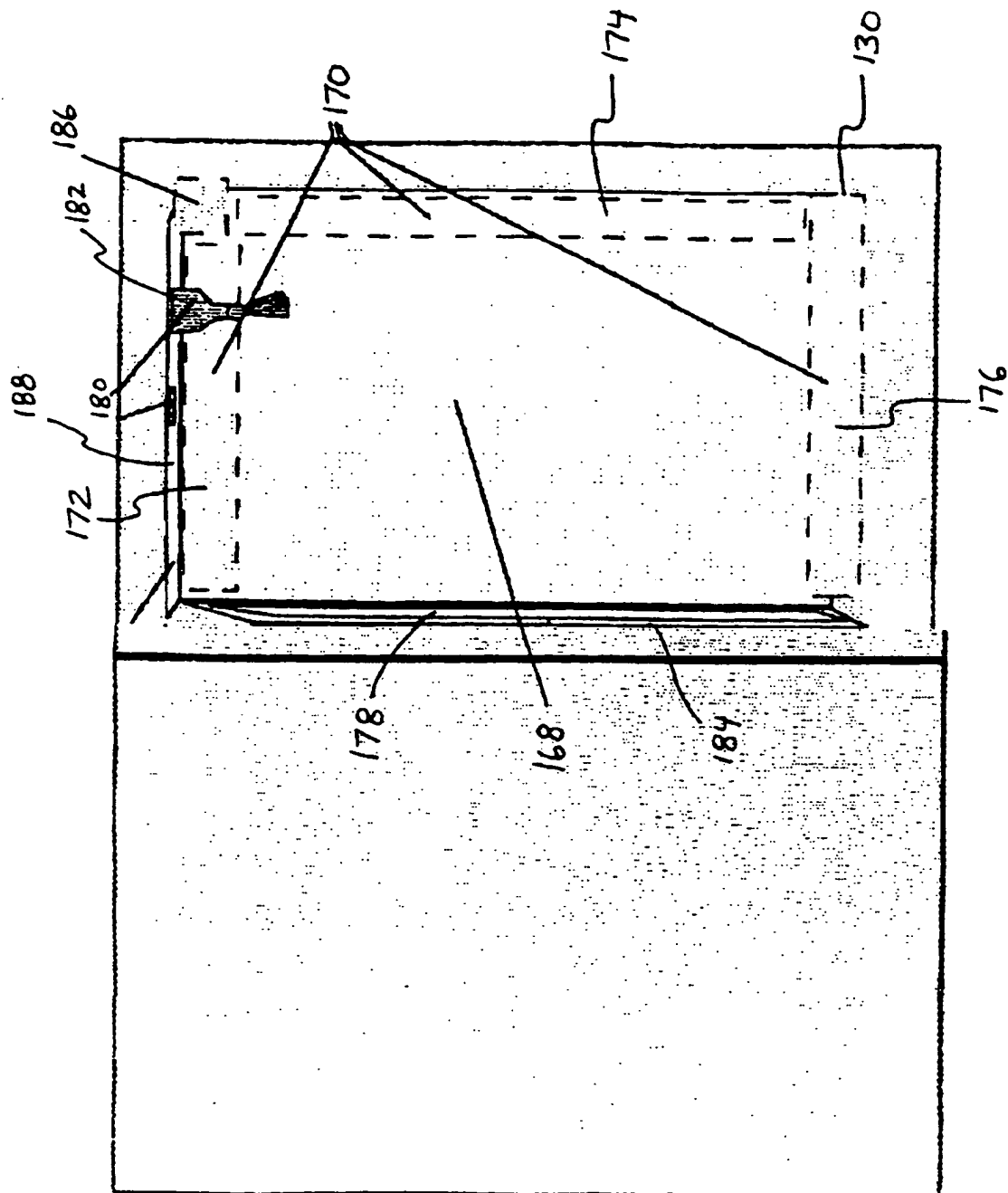


FIG. 4

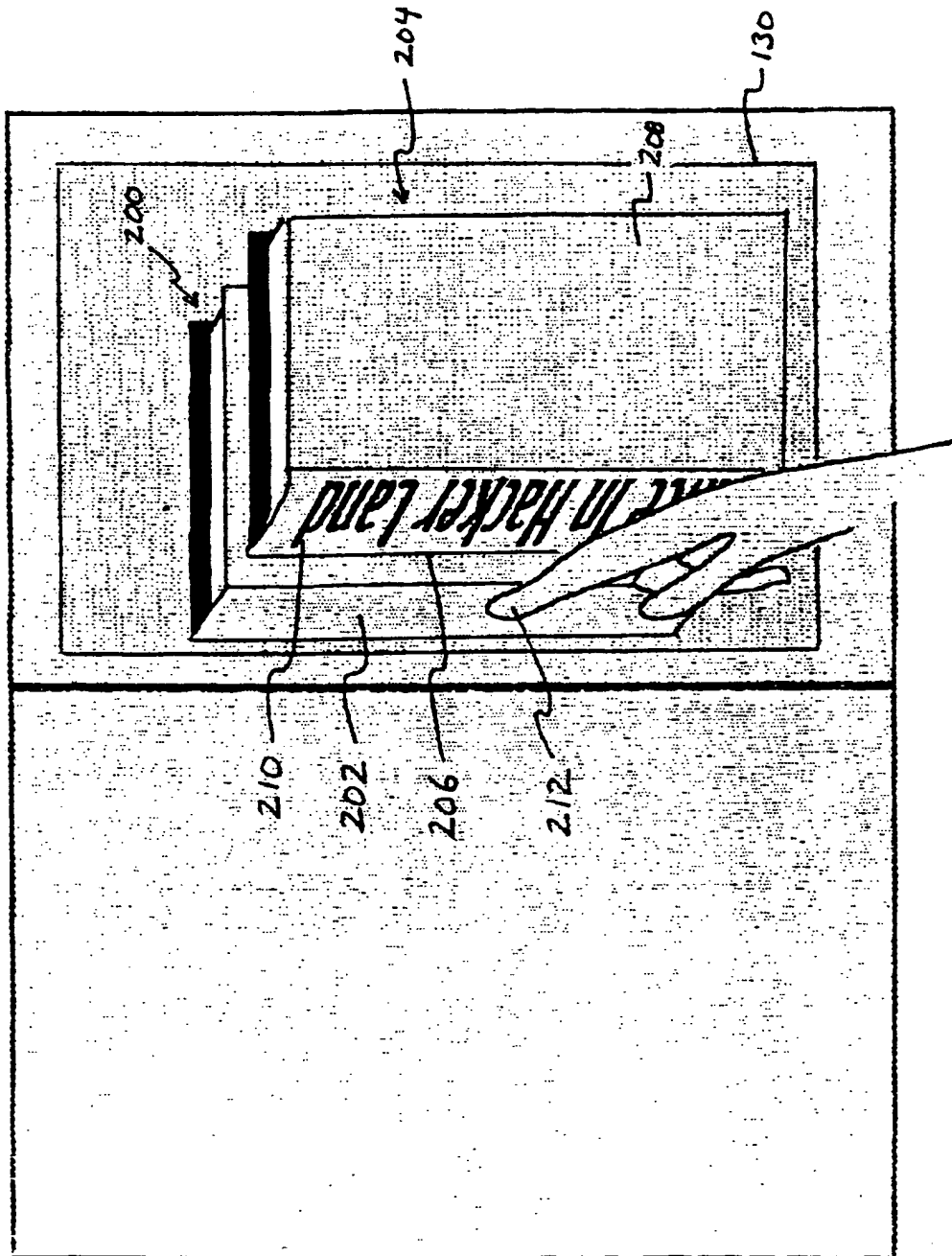


Fig. 5

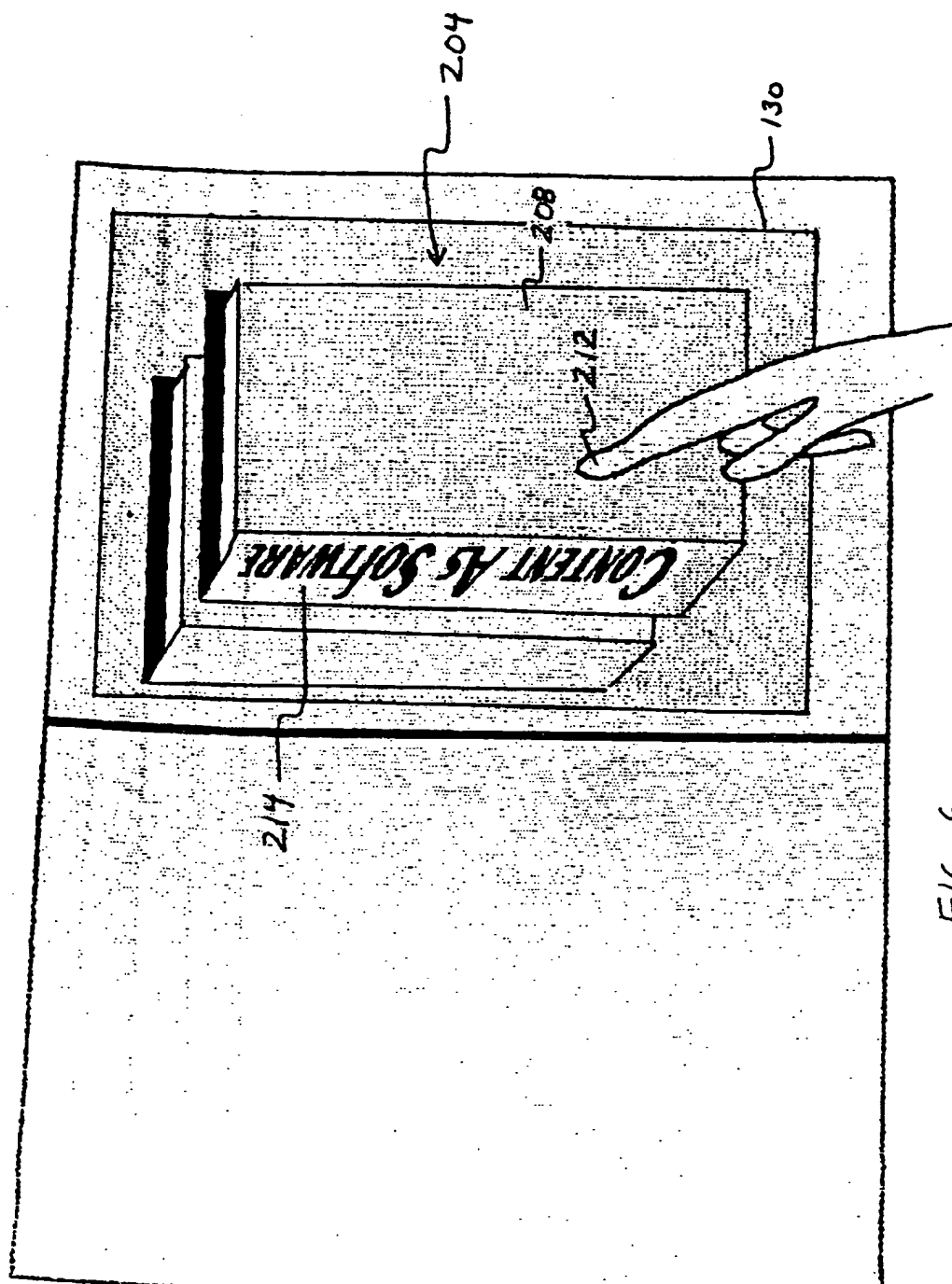


FIG. 6

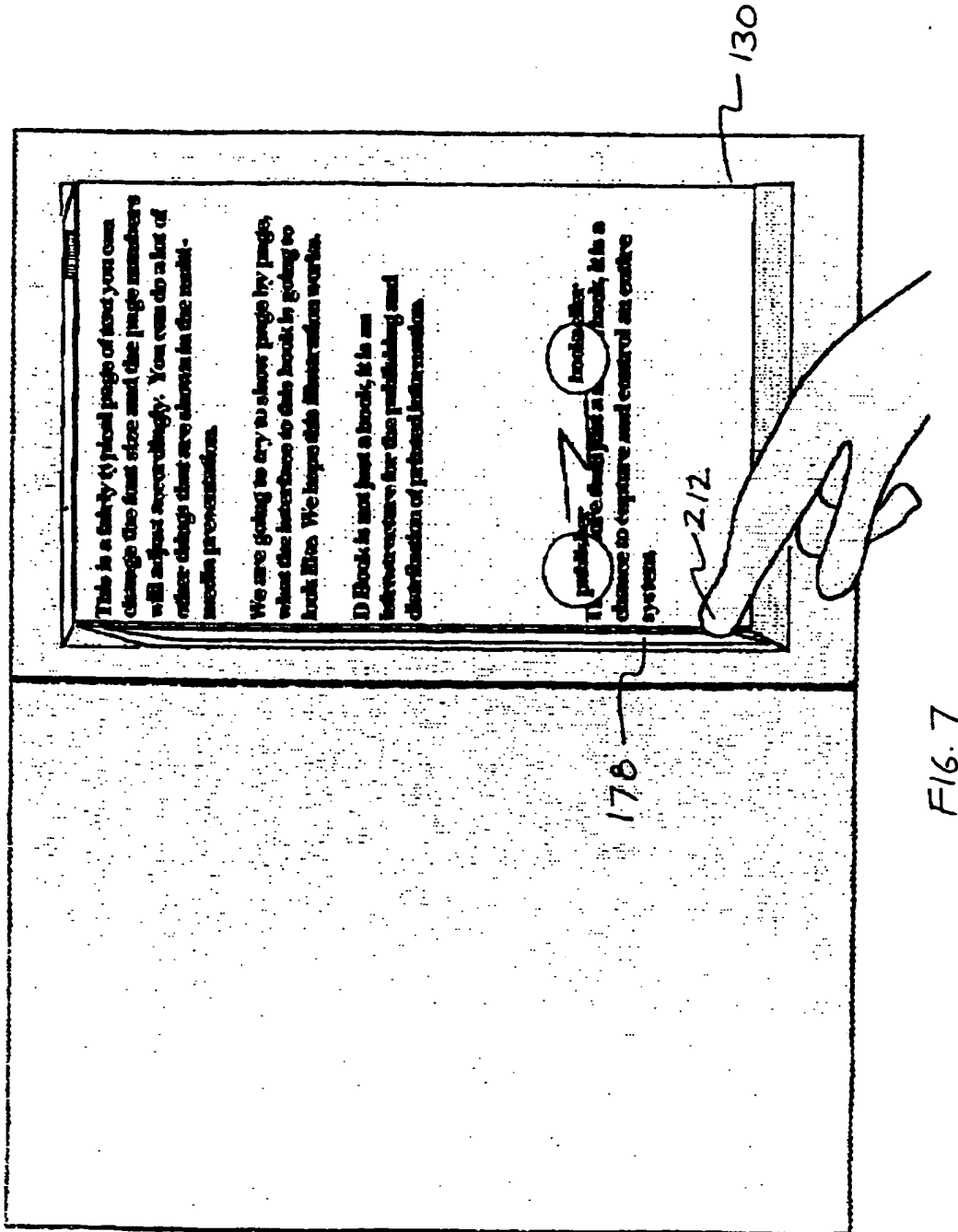


FIG. 7

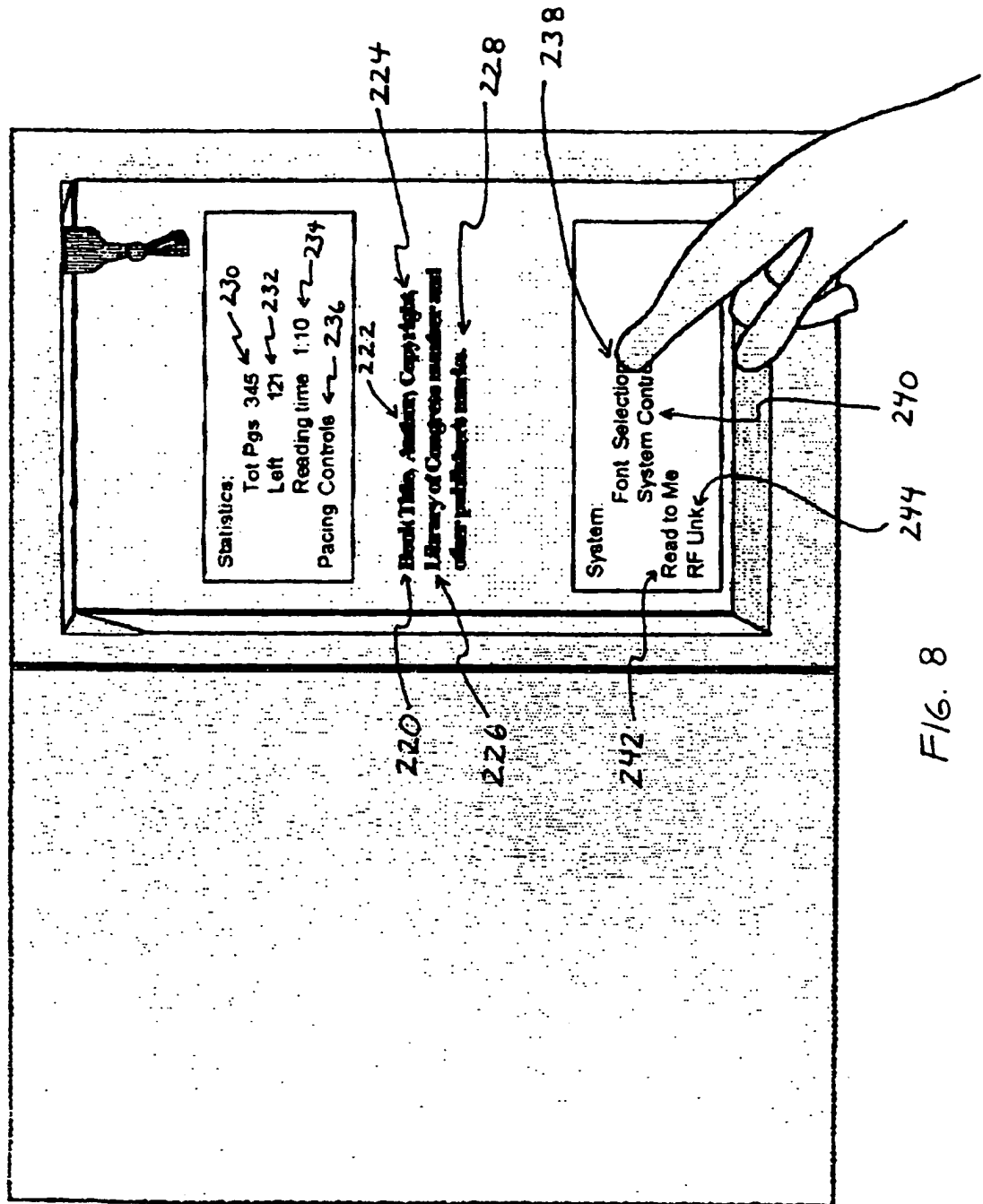


FIG. 8

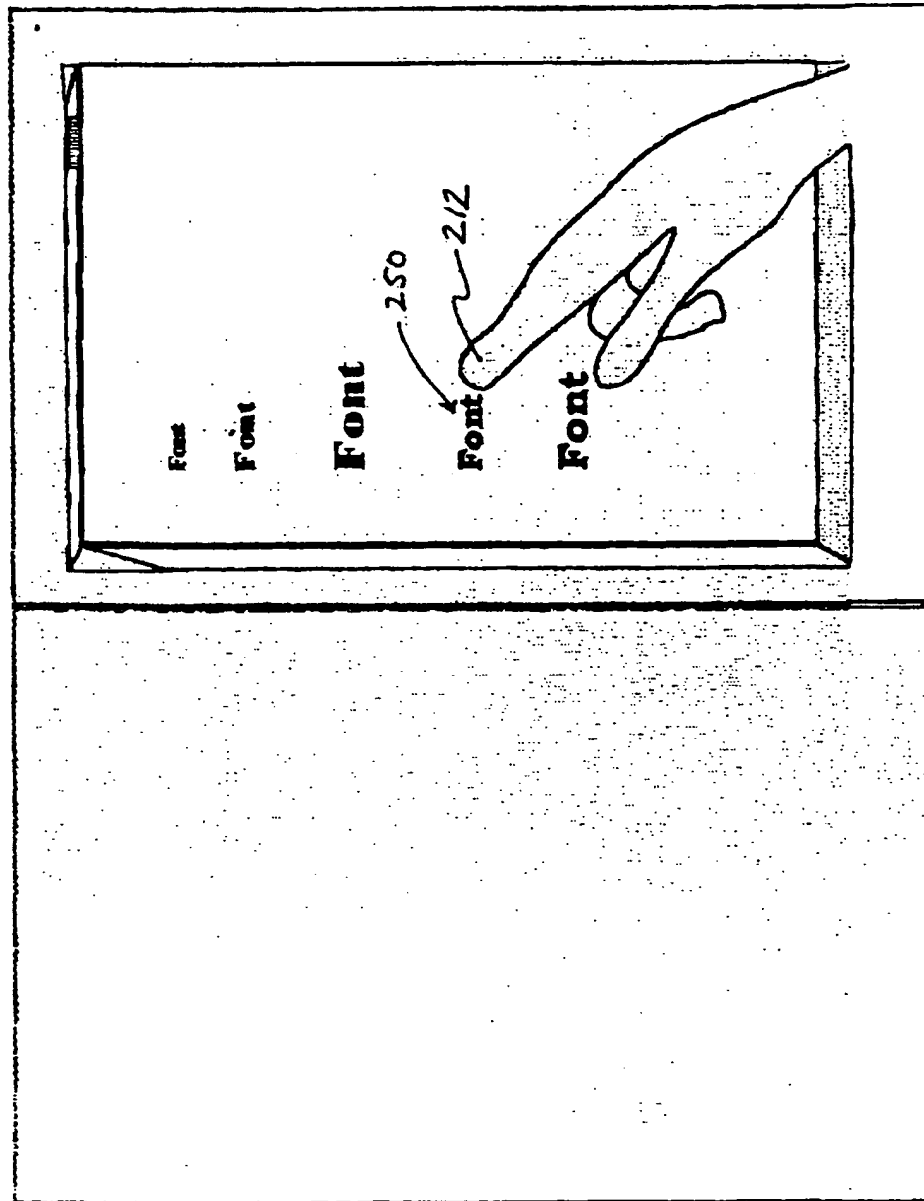


FIG. 9

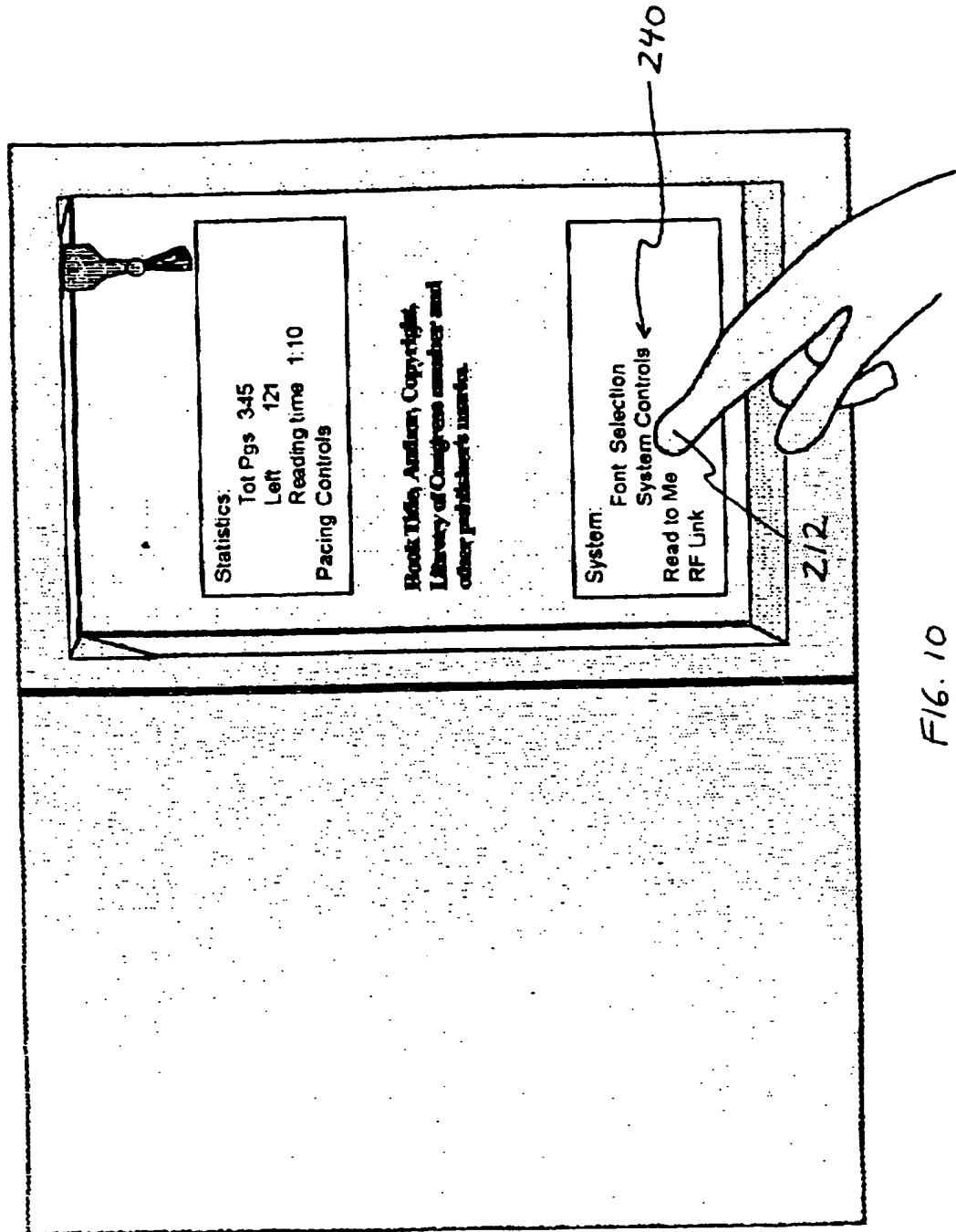


FIG. 10

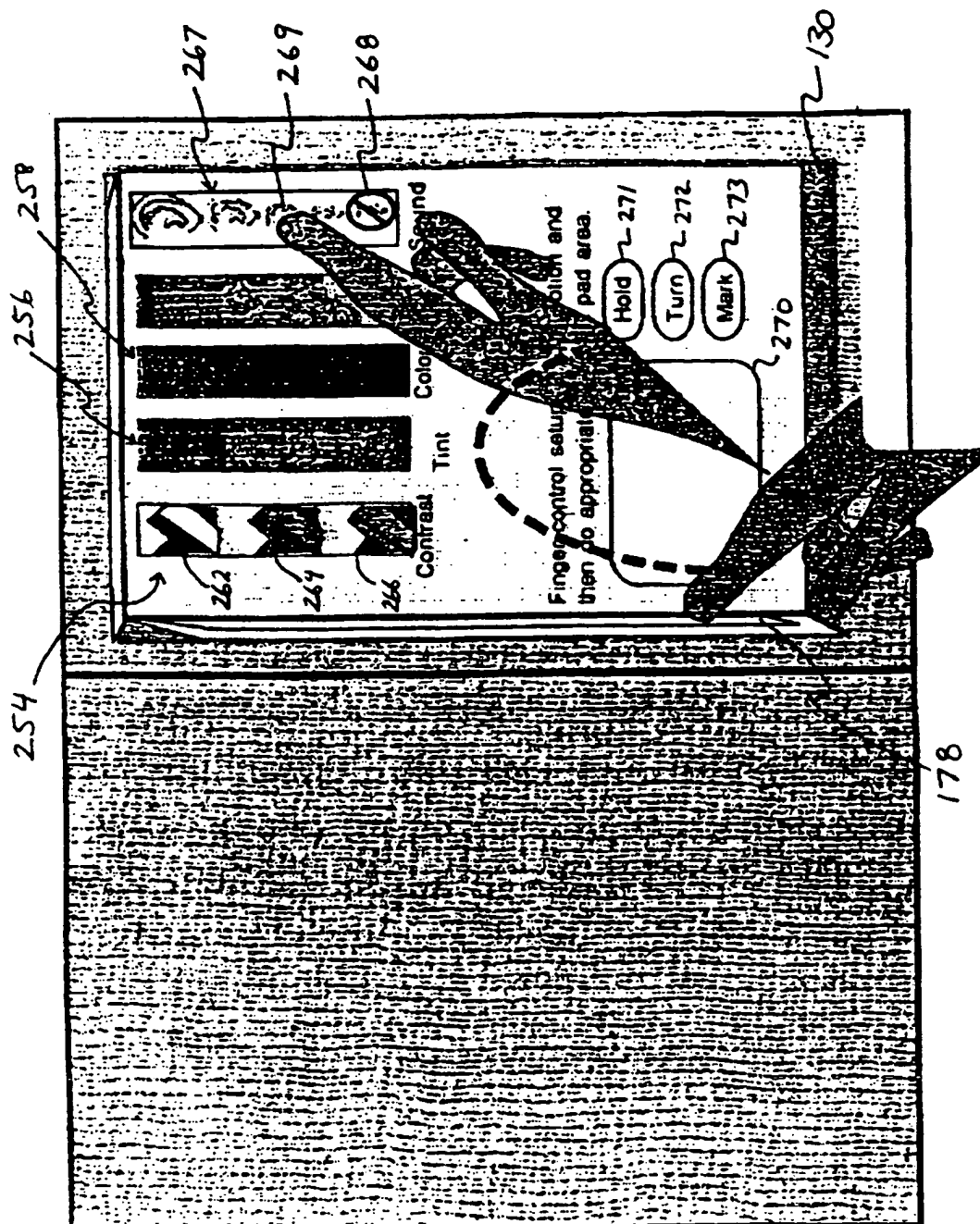


FIG. 11

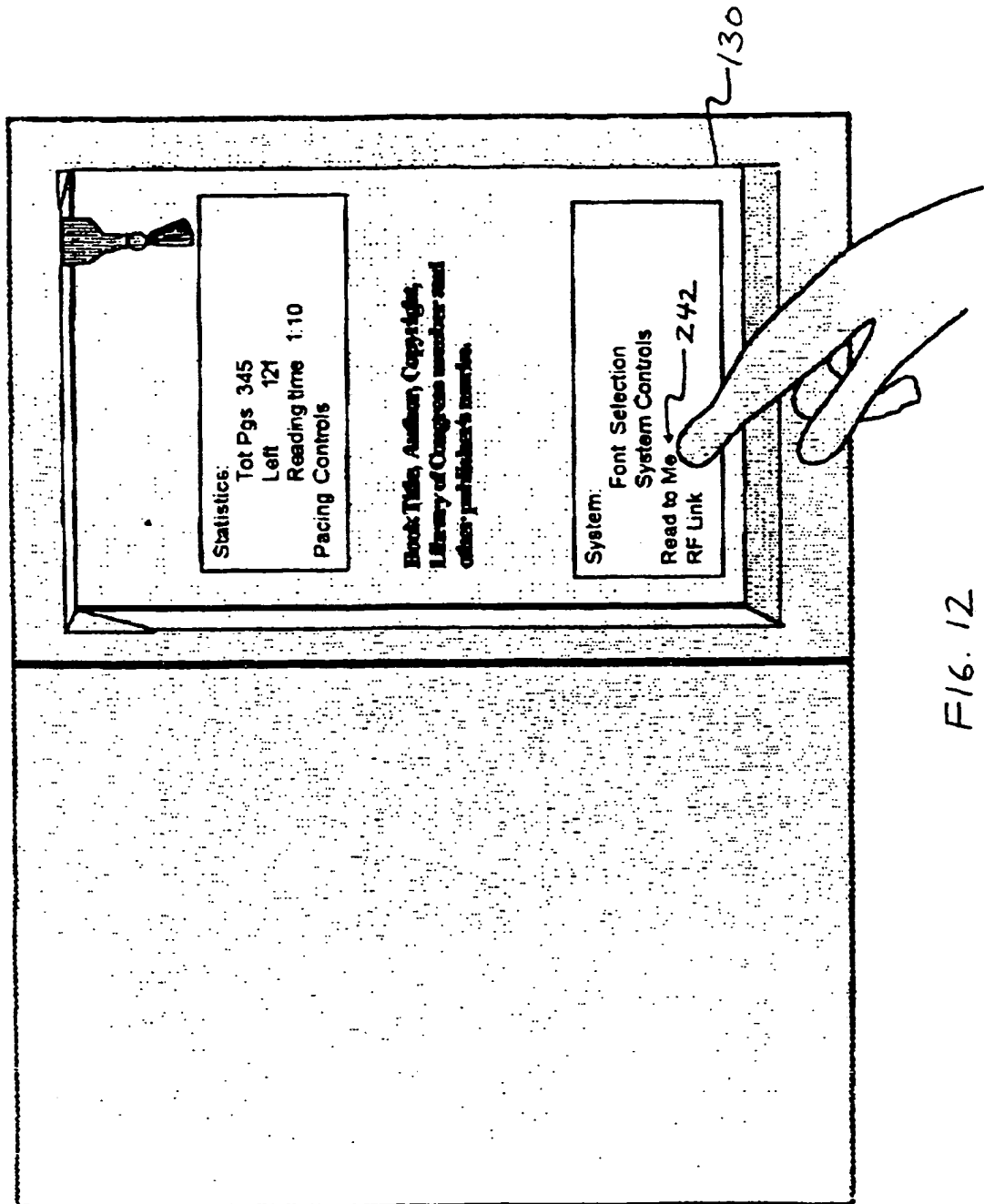
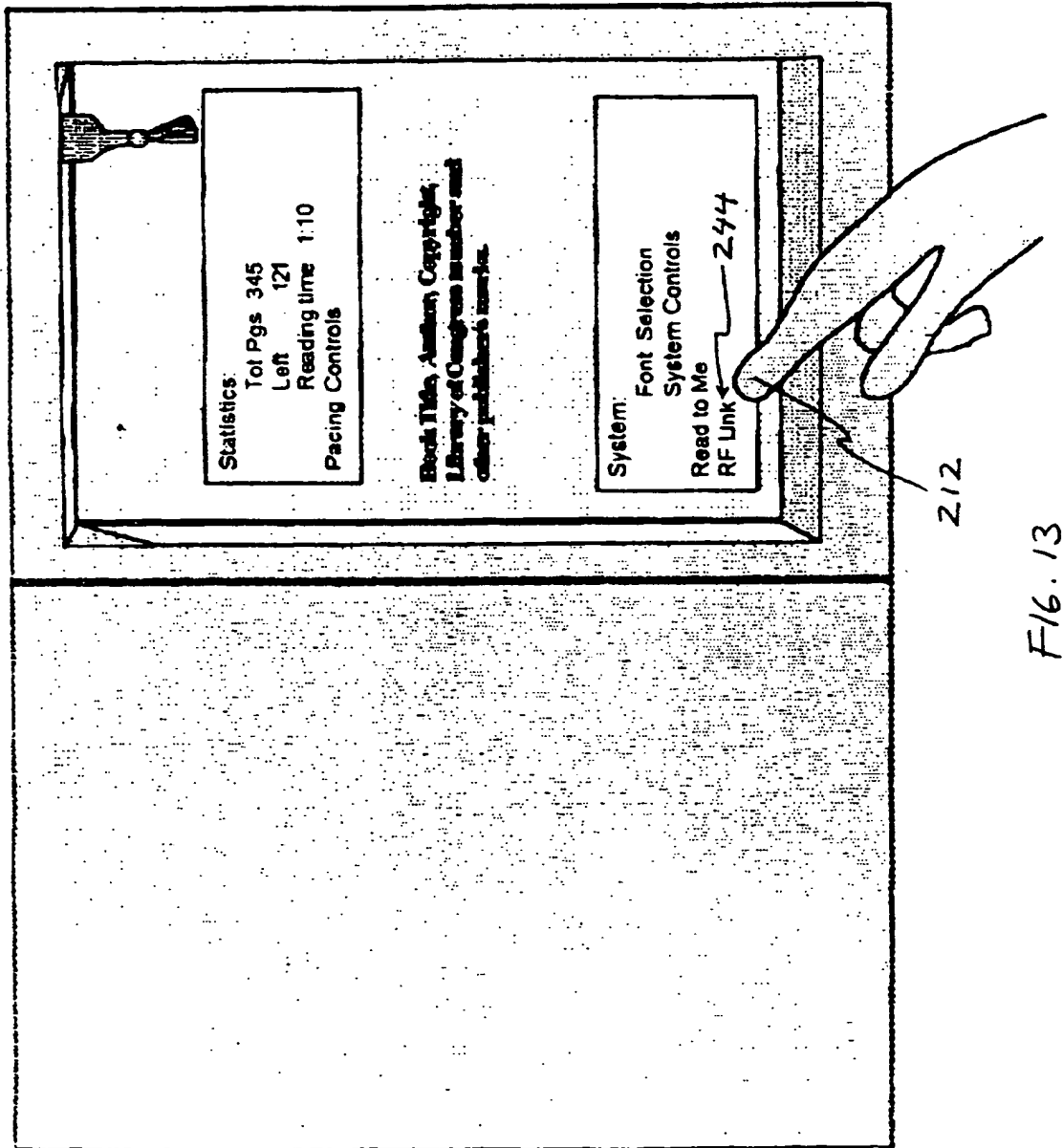


FIG. 12



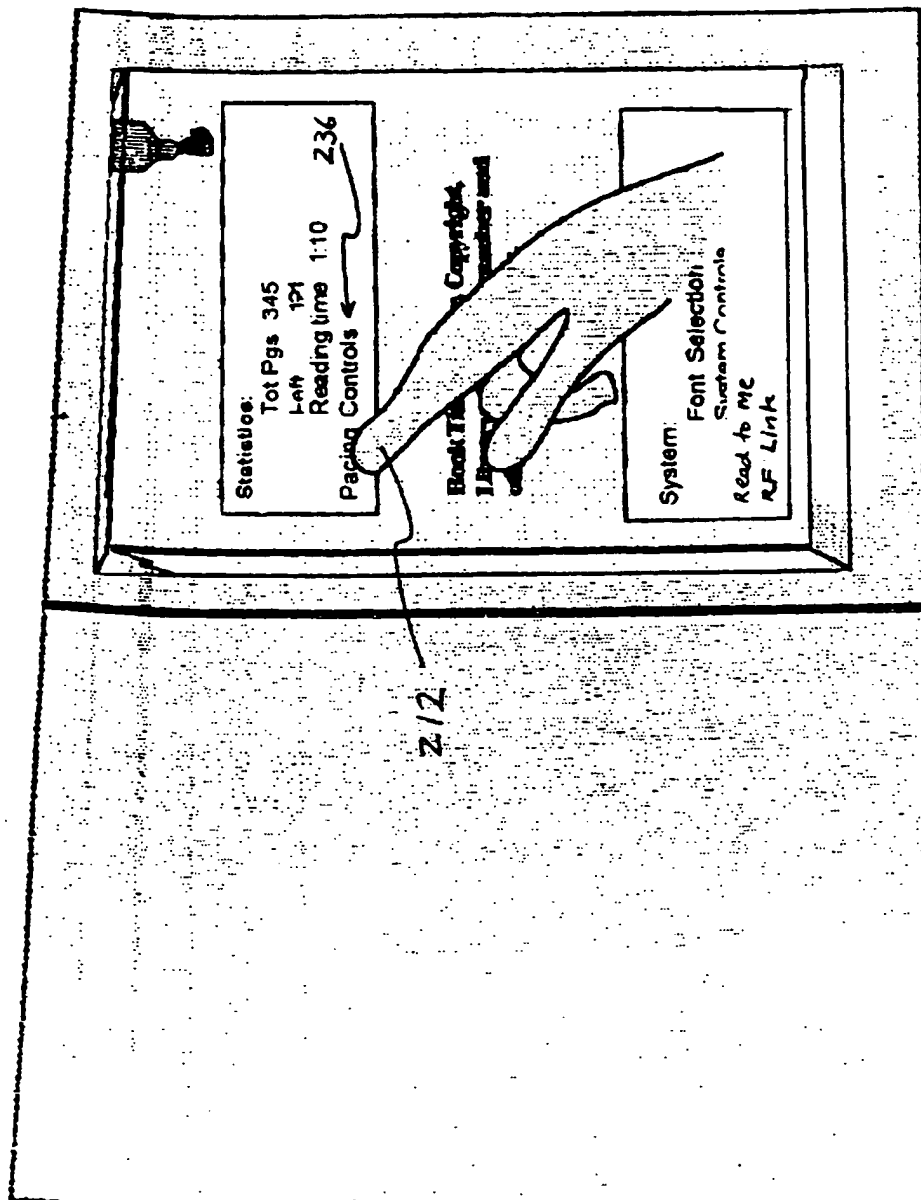


FIG. 14

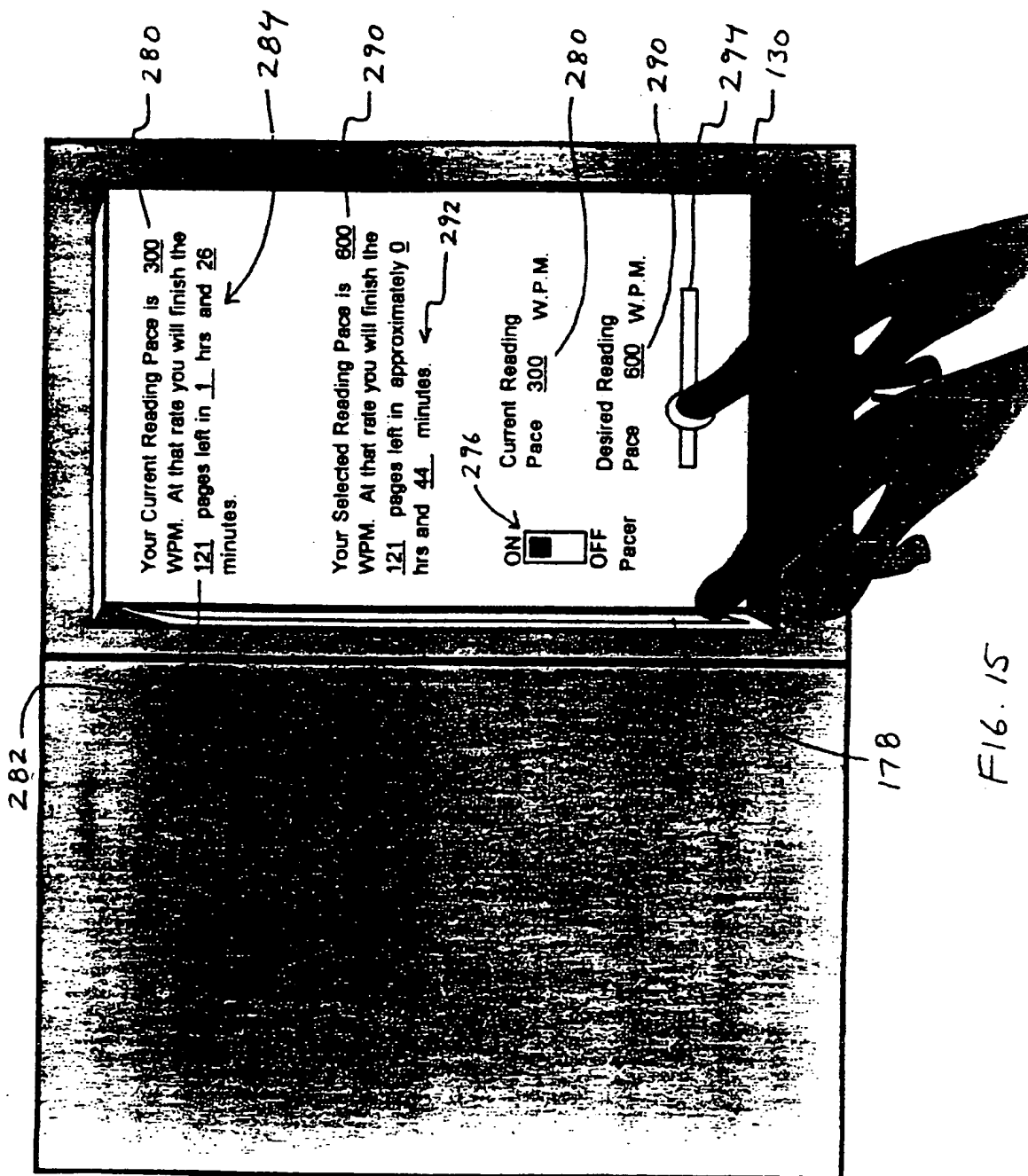


Fig. 15

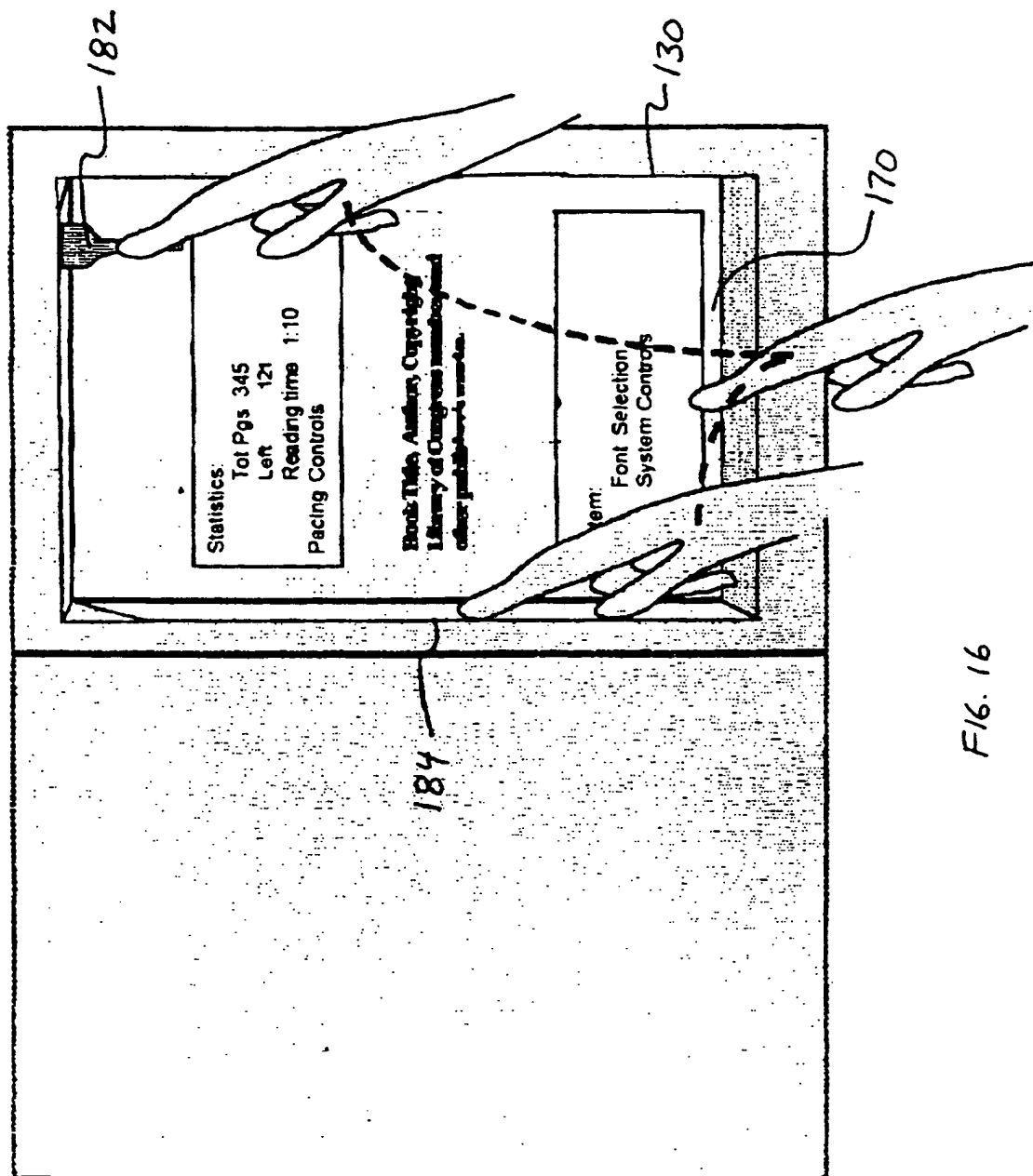


FIG. 16

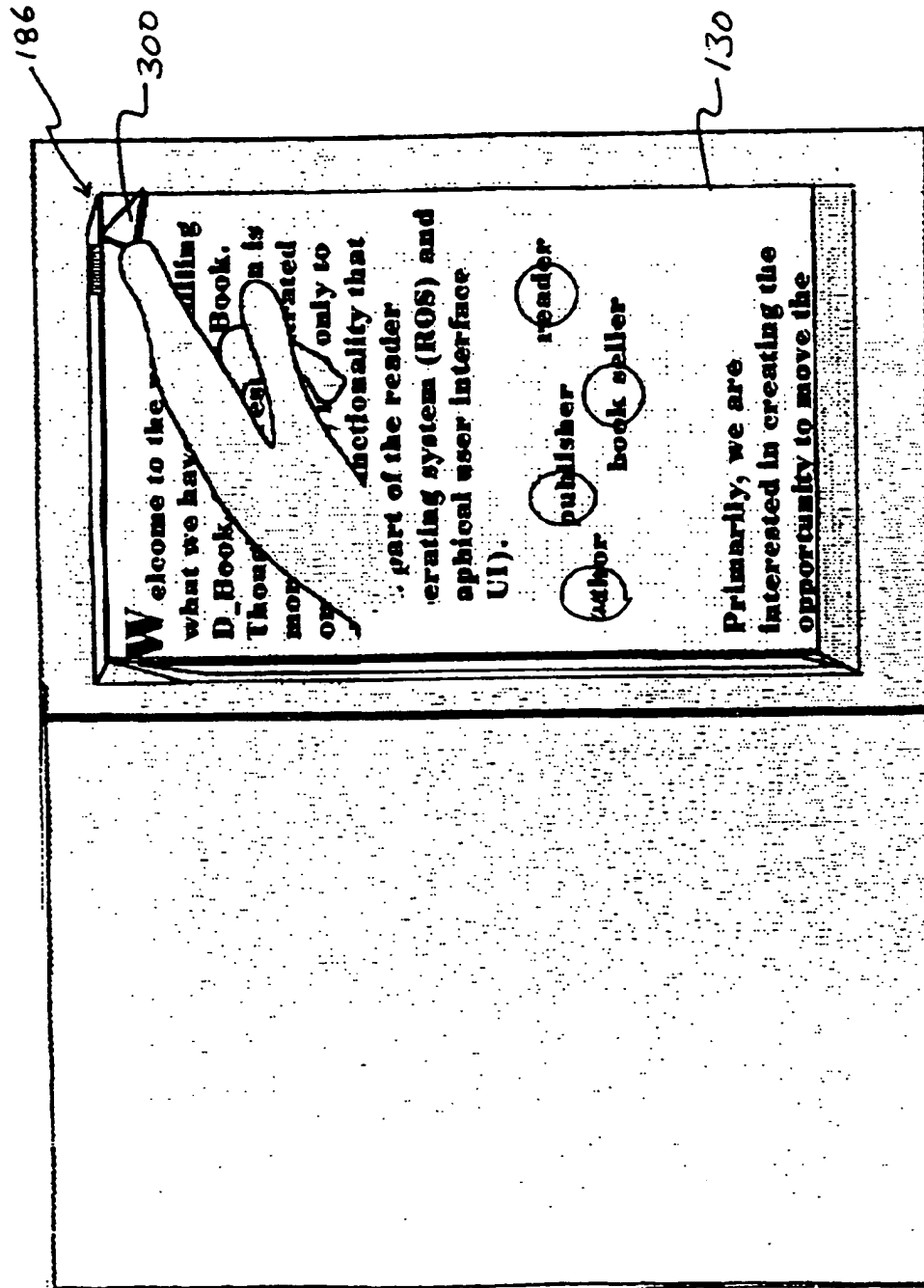


FIG. 17

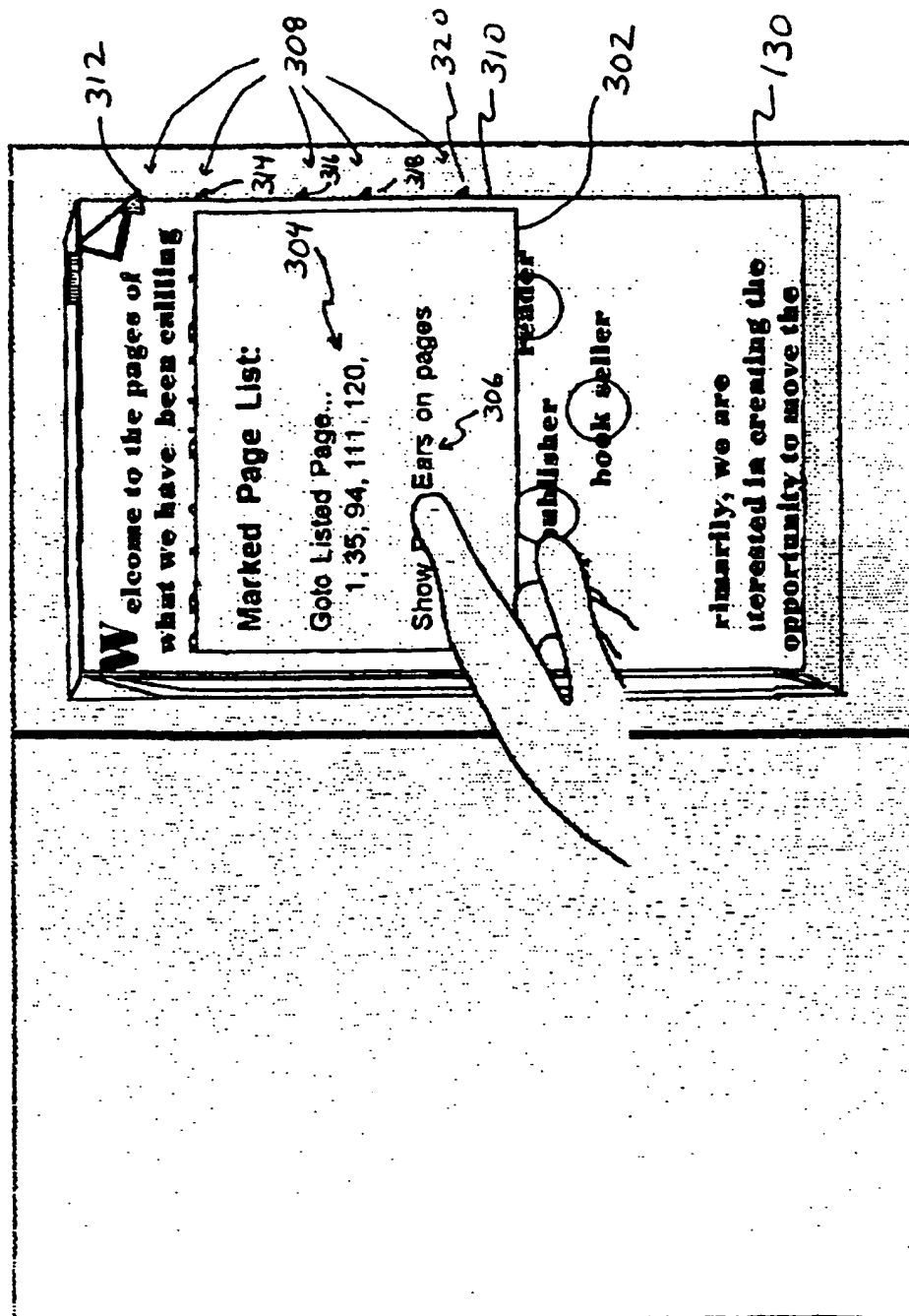


Fig. 18

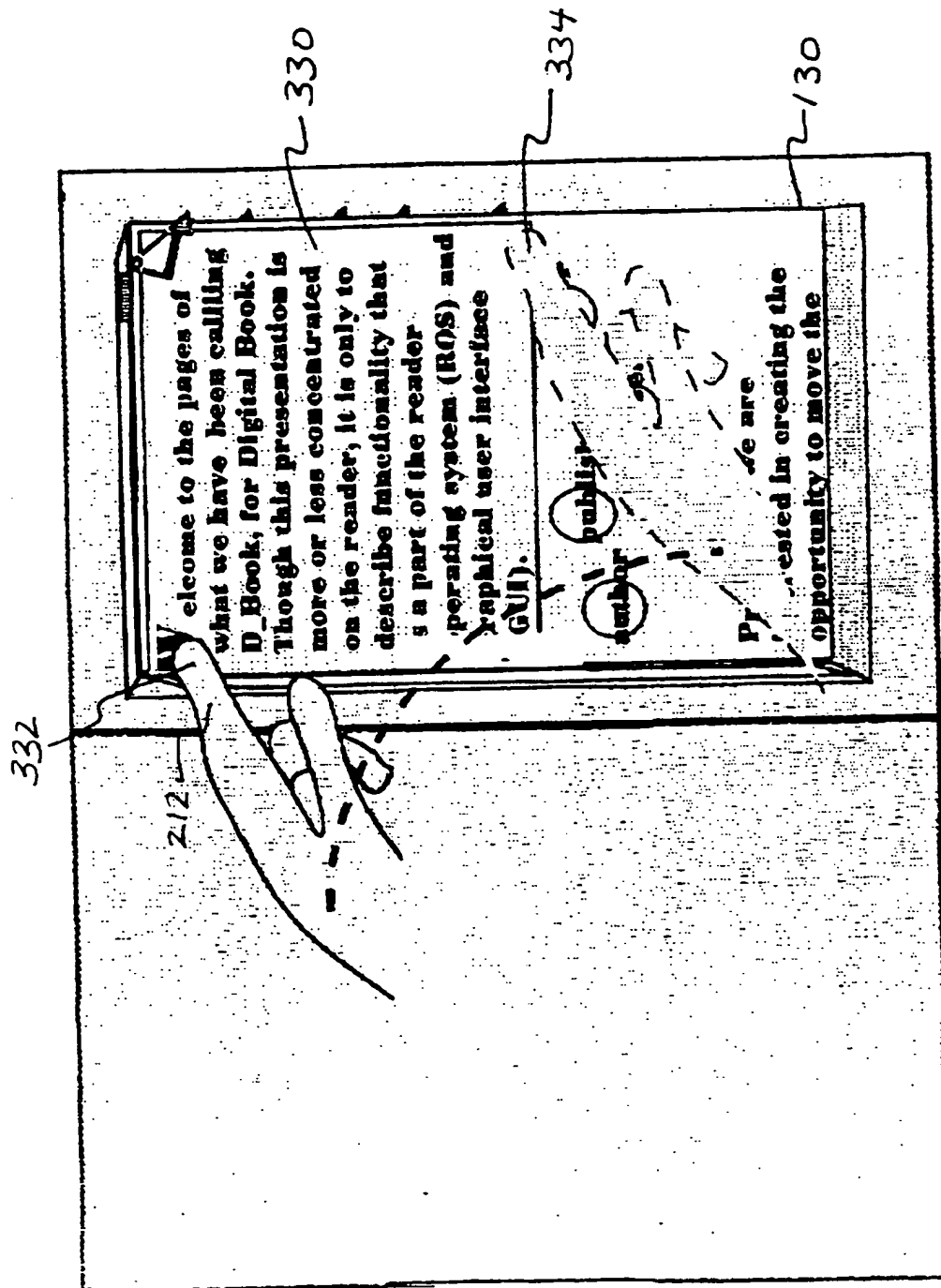


Fig. 19

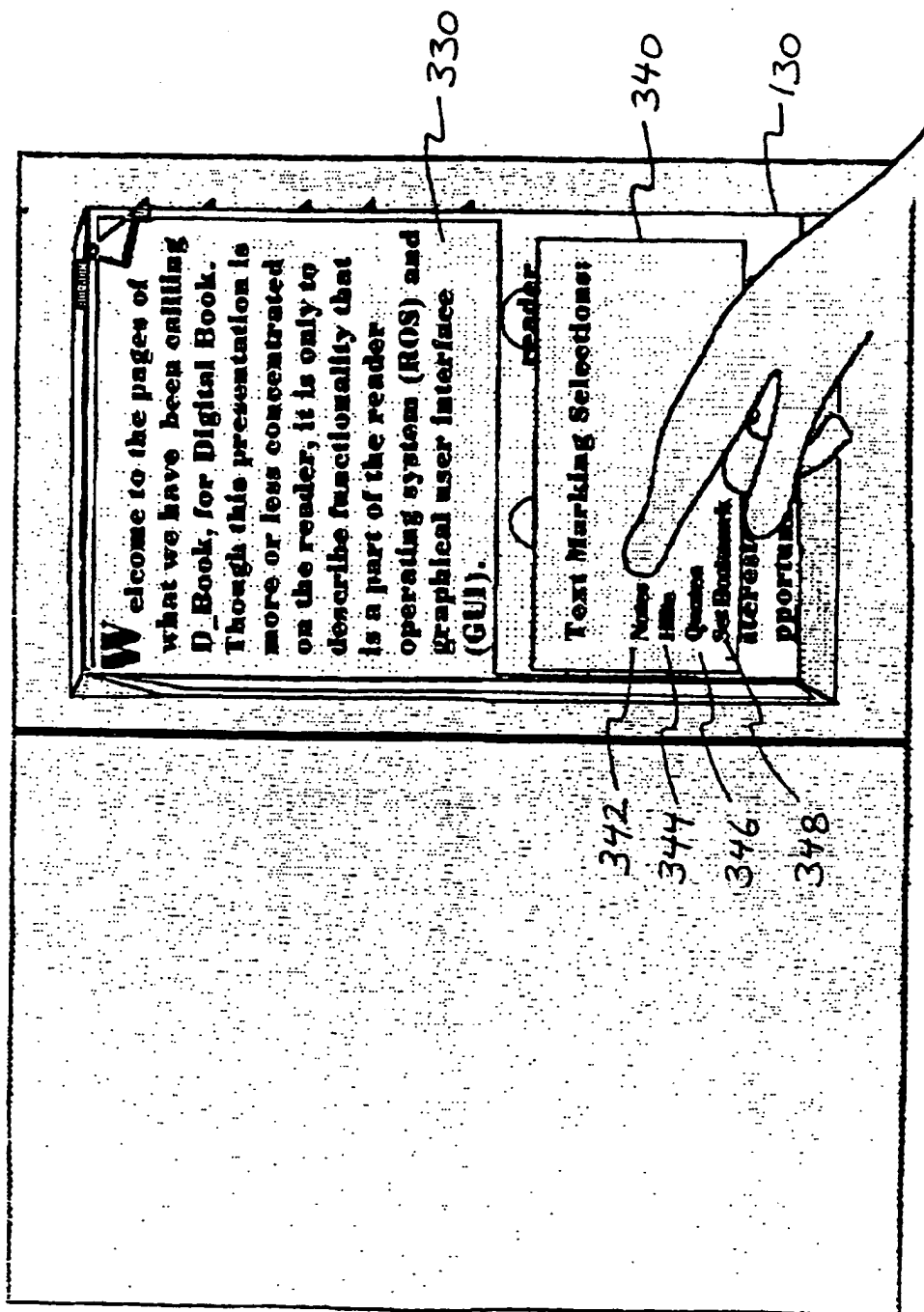


FIG. 20

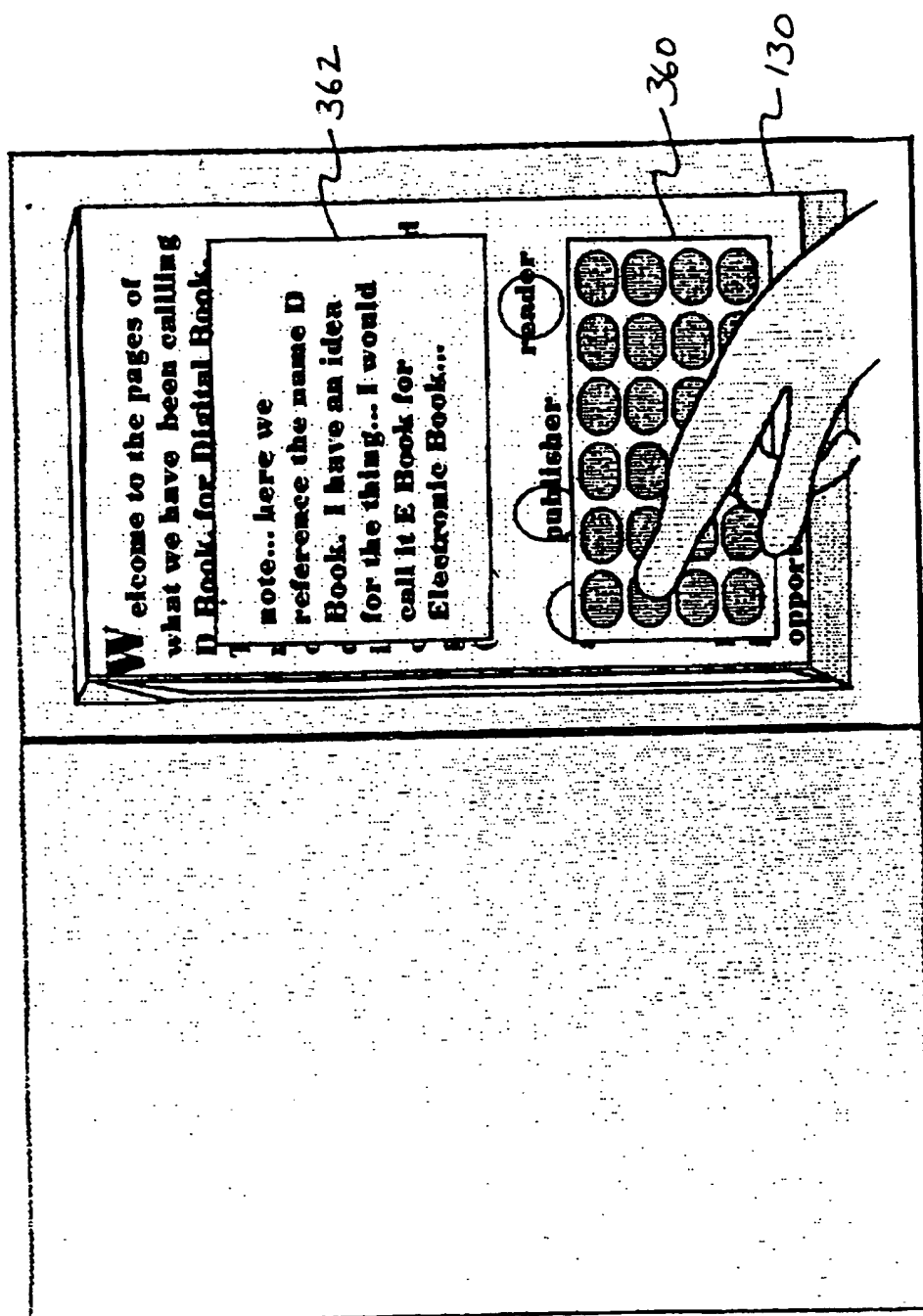
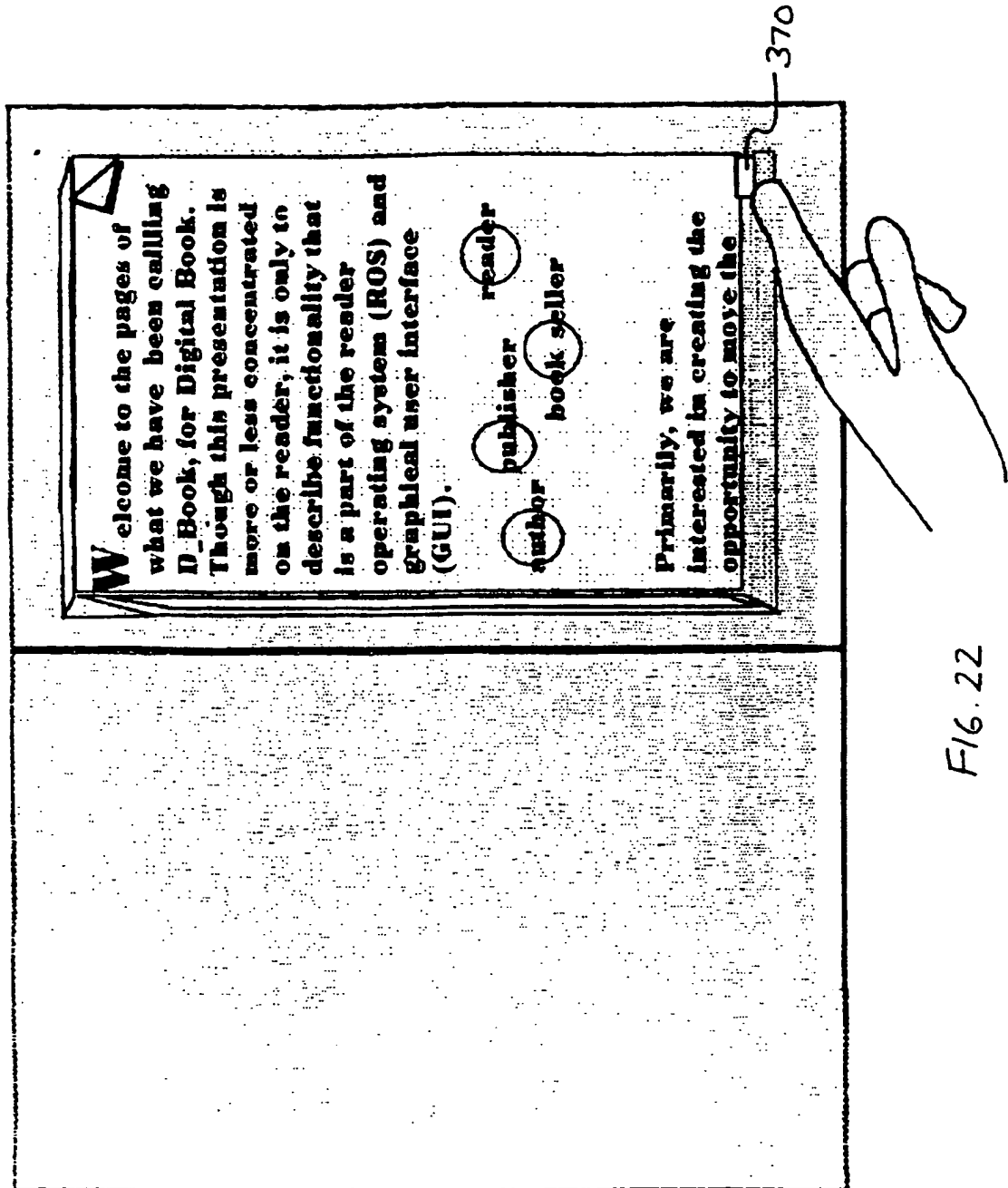


FIG. 21



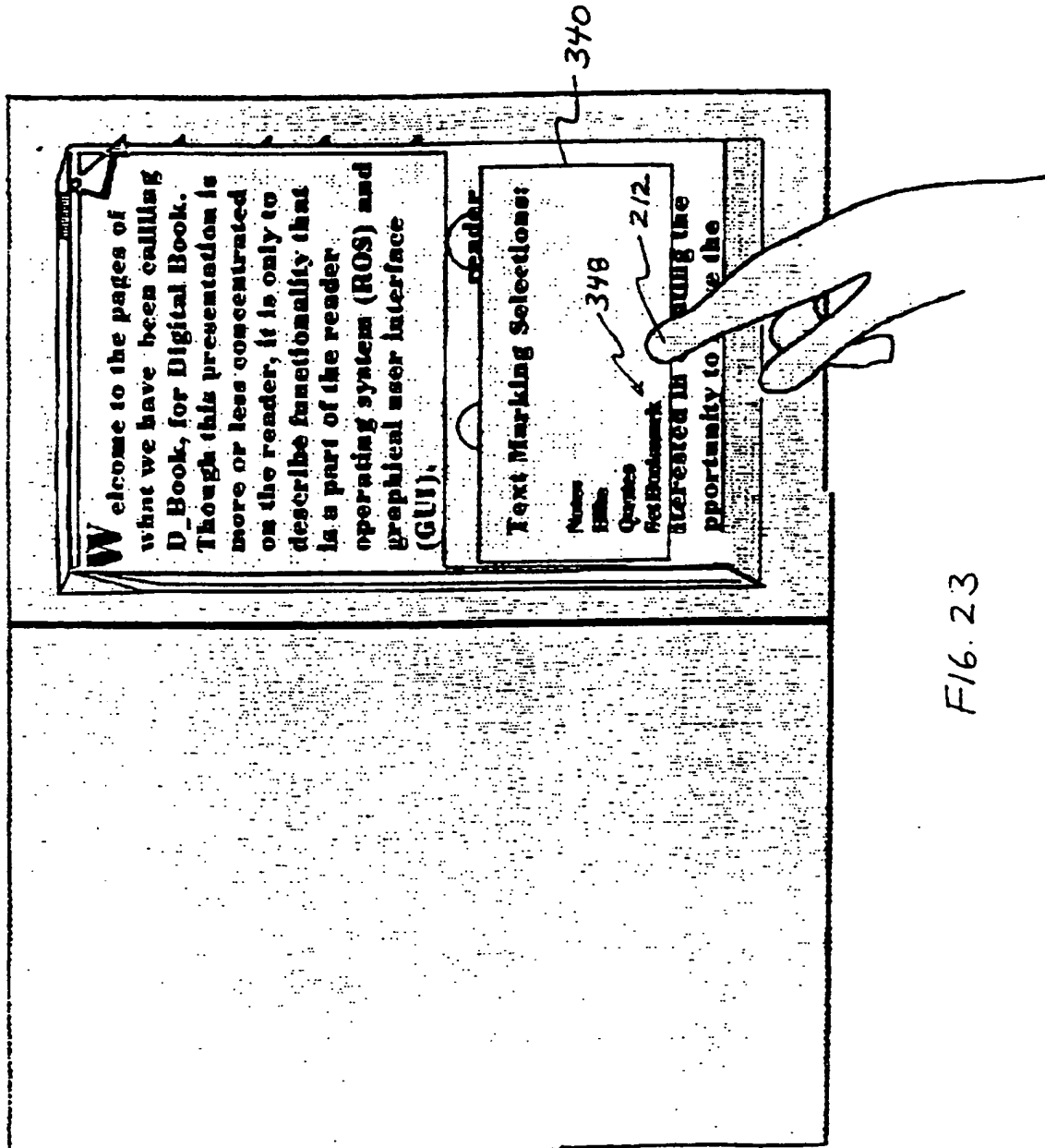


FIG. 23

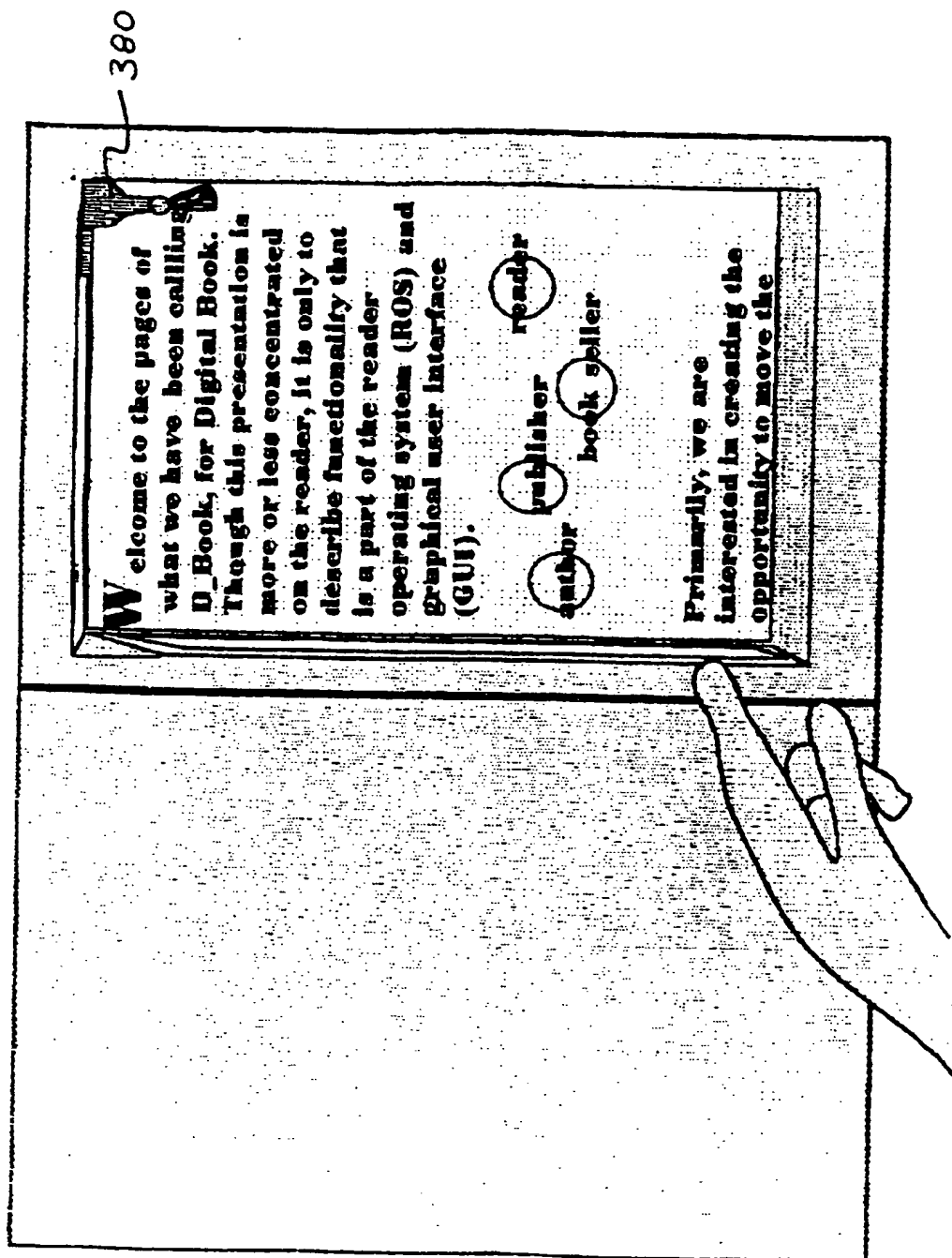
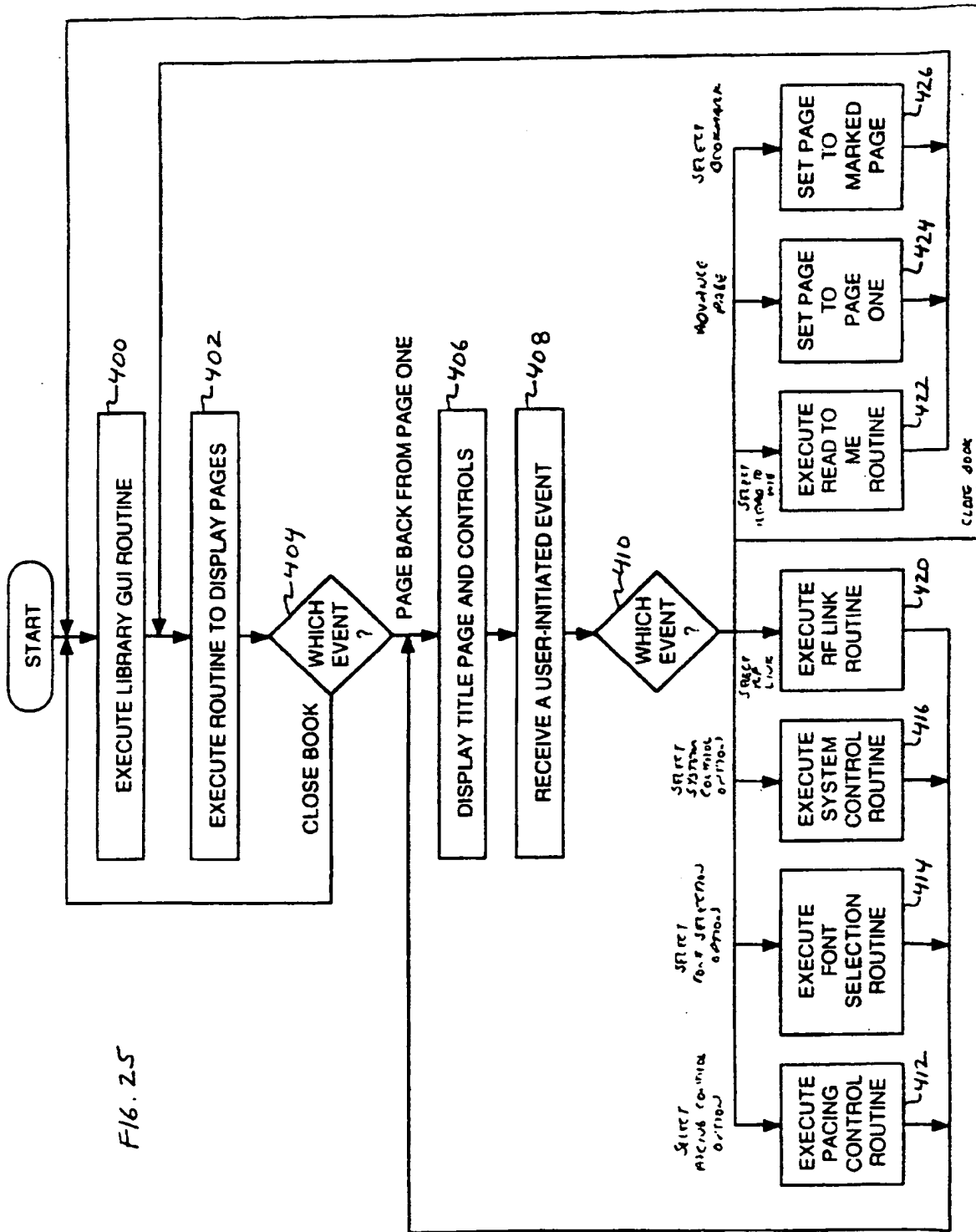


FIG. 24



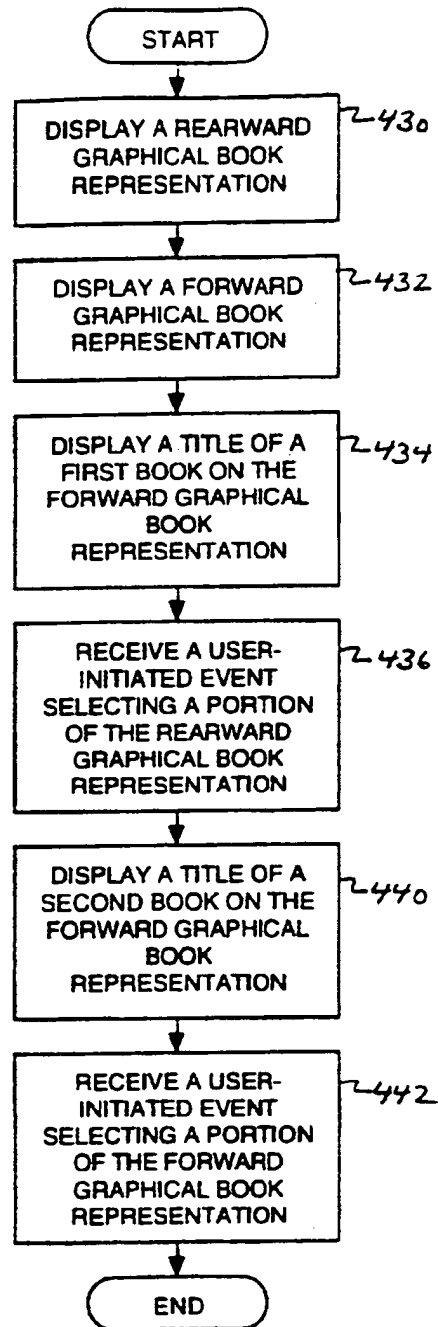
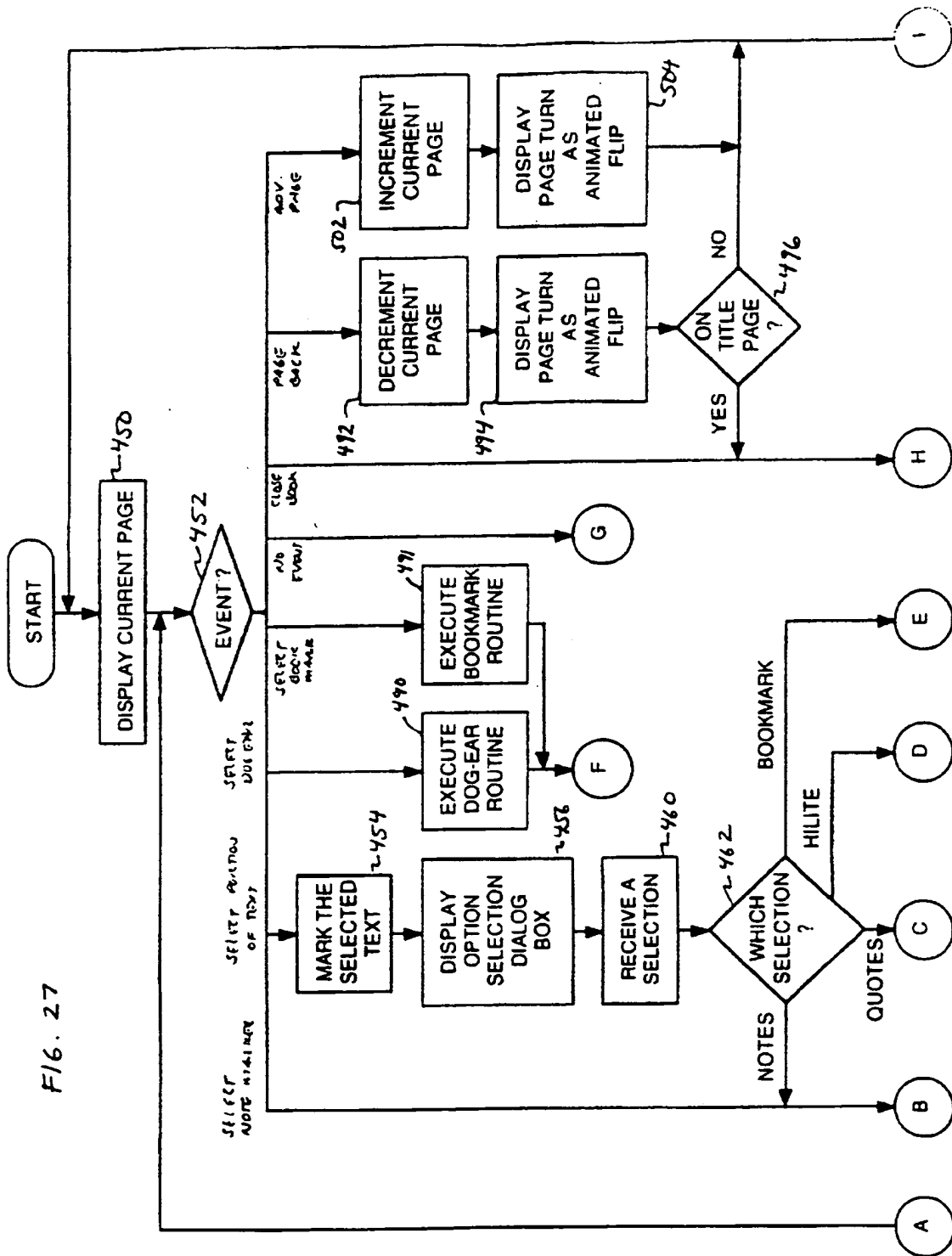


FIG. 26



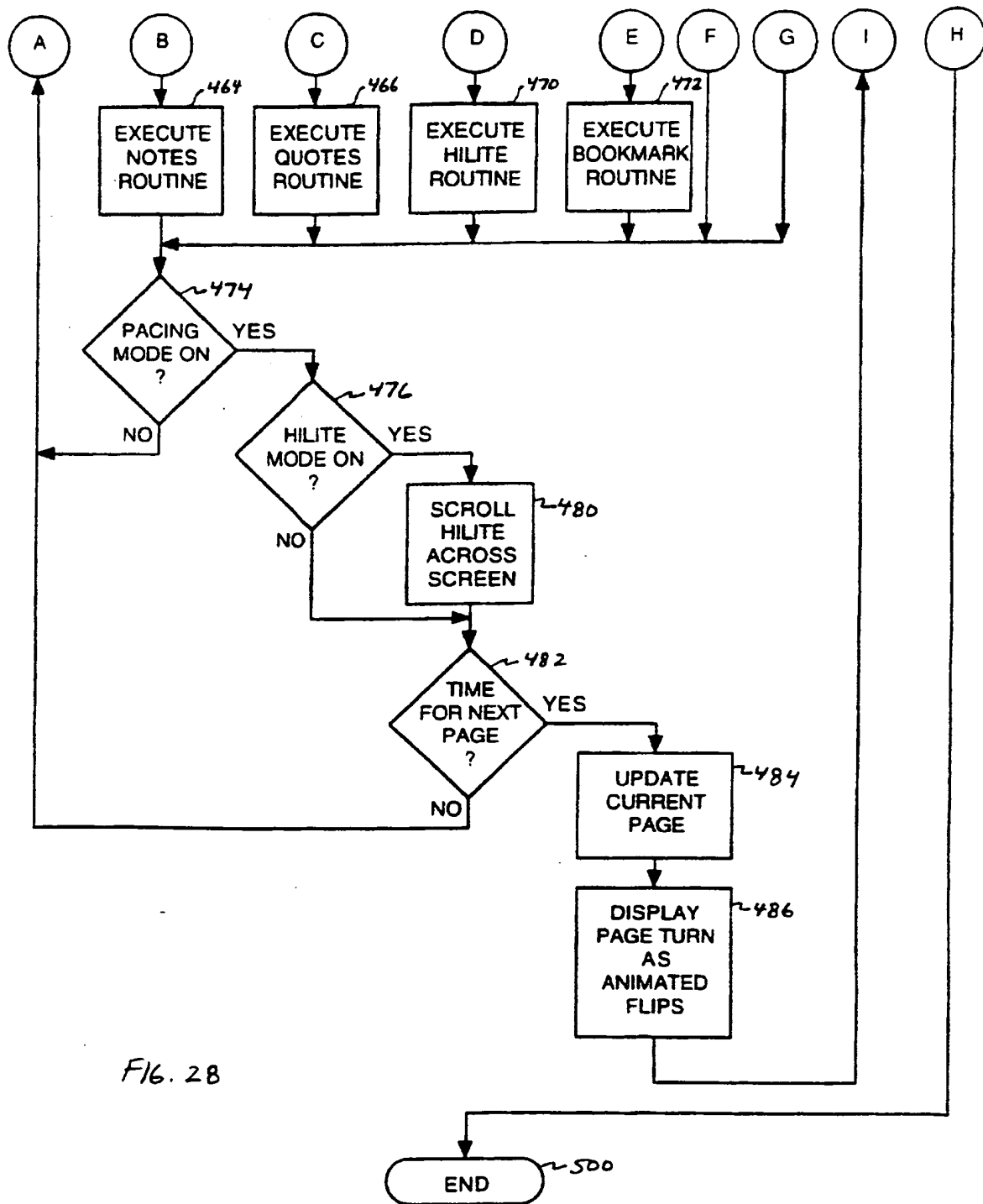
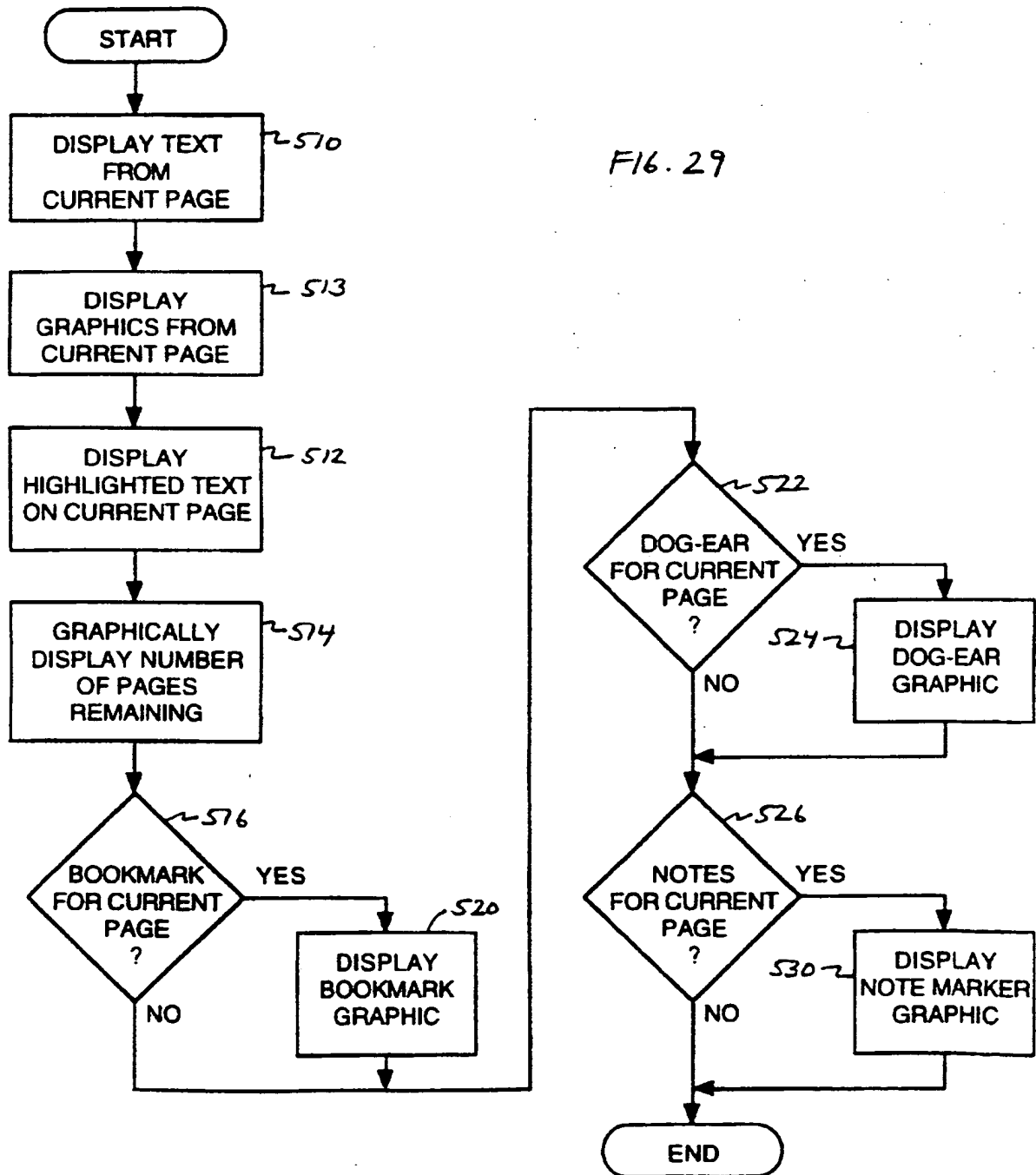
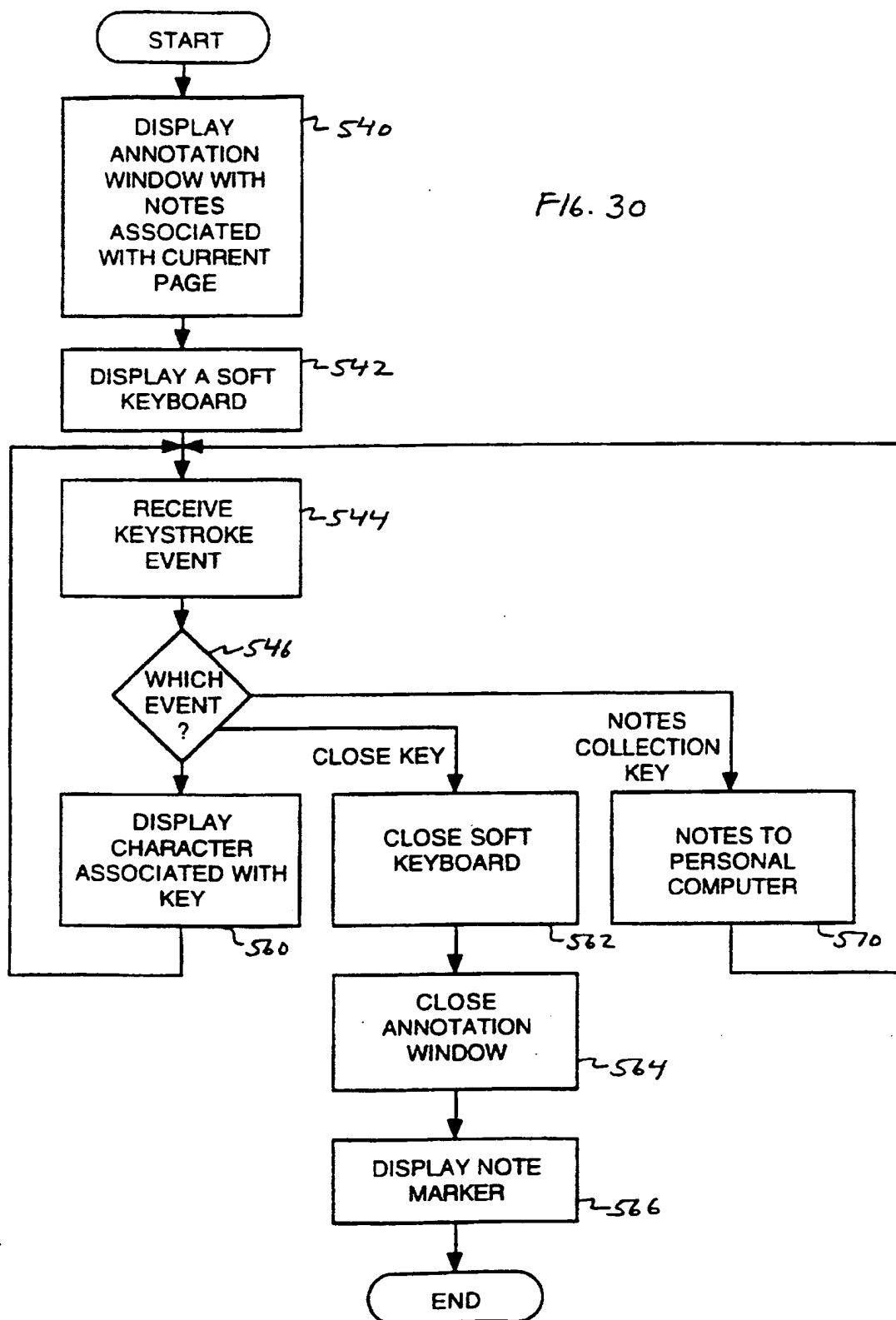


FIG. 28

FIG. 29





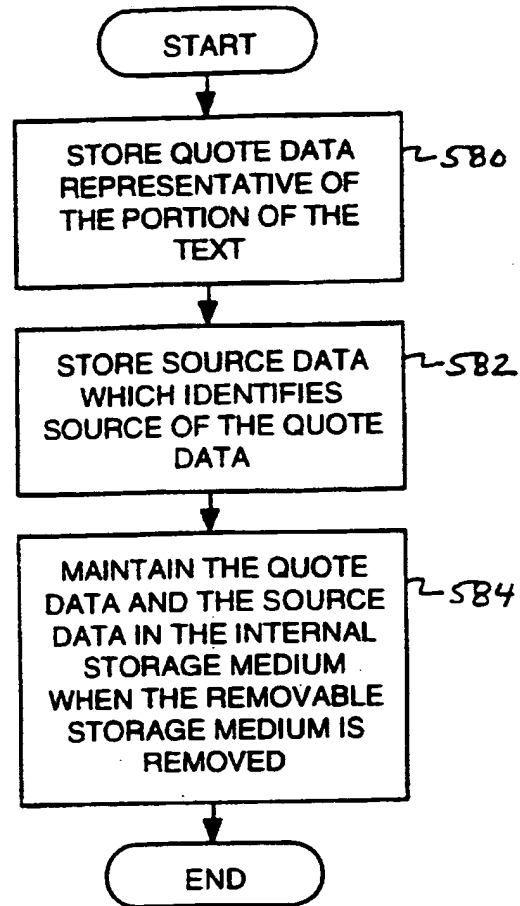
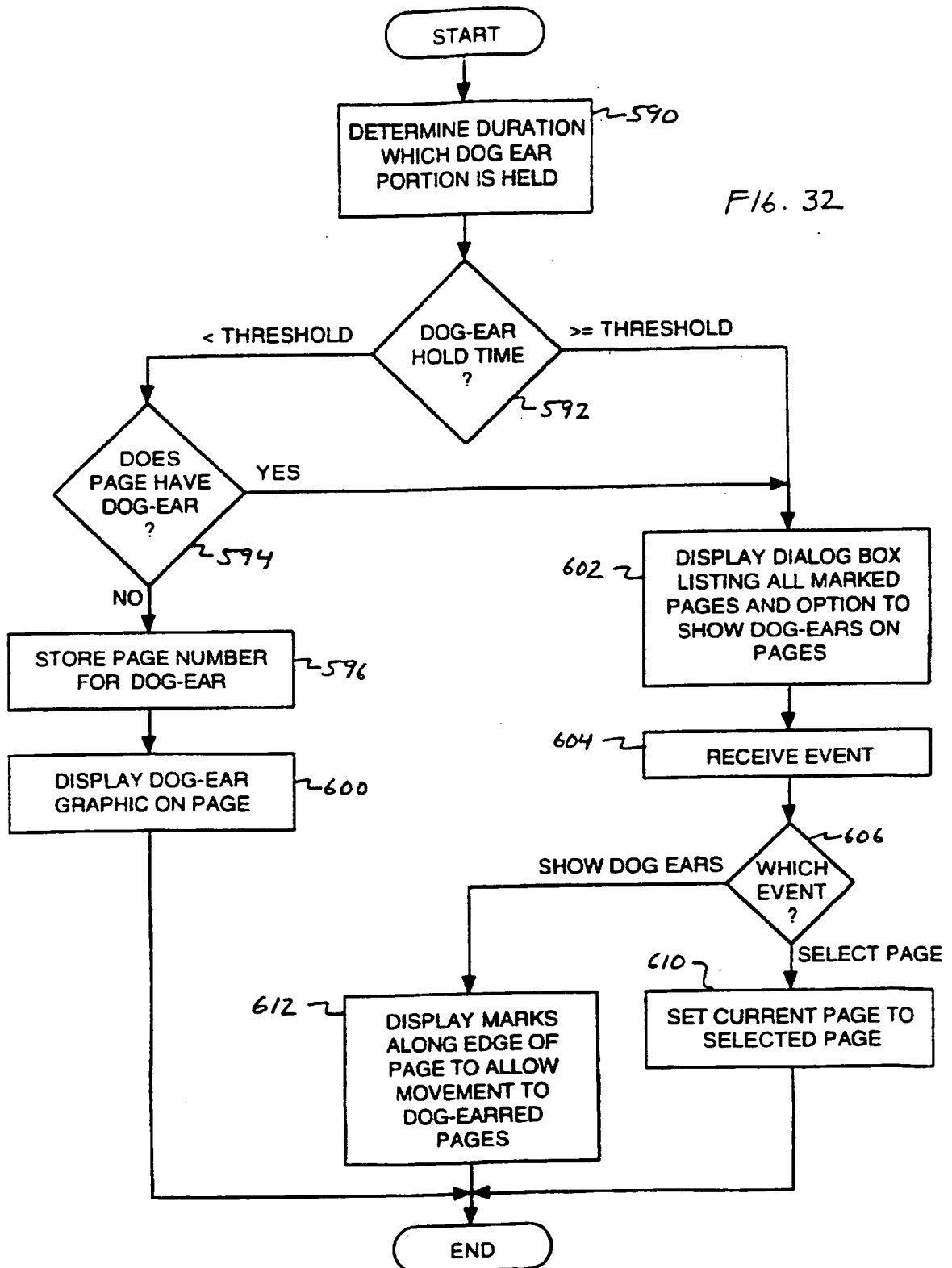
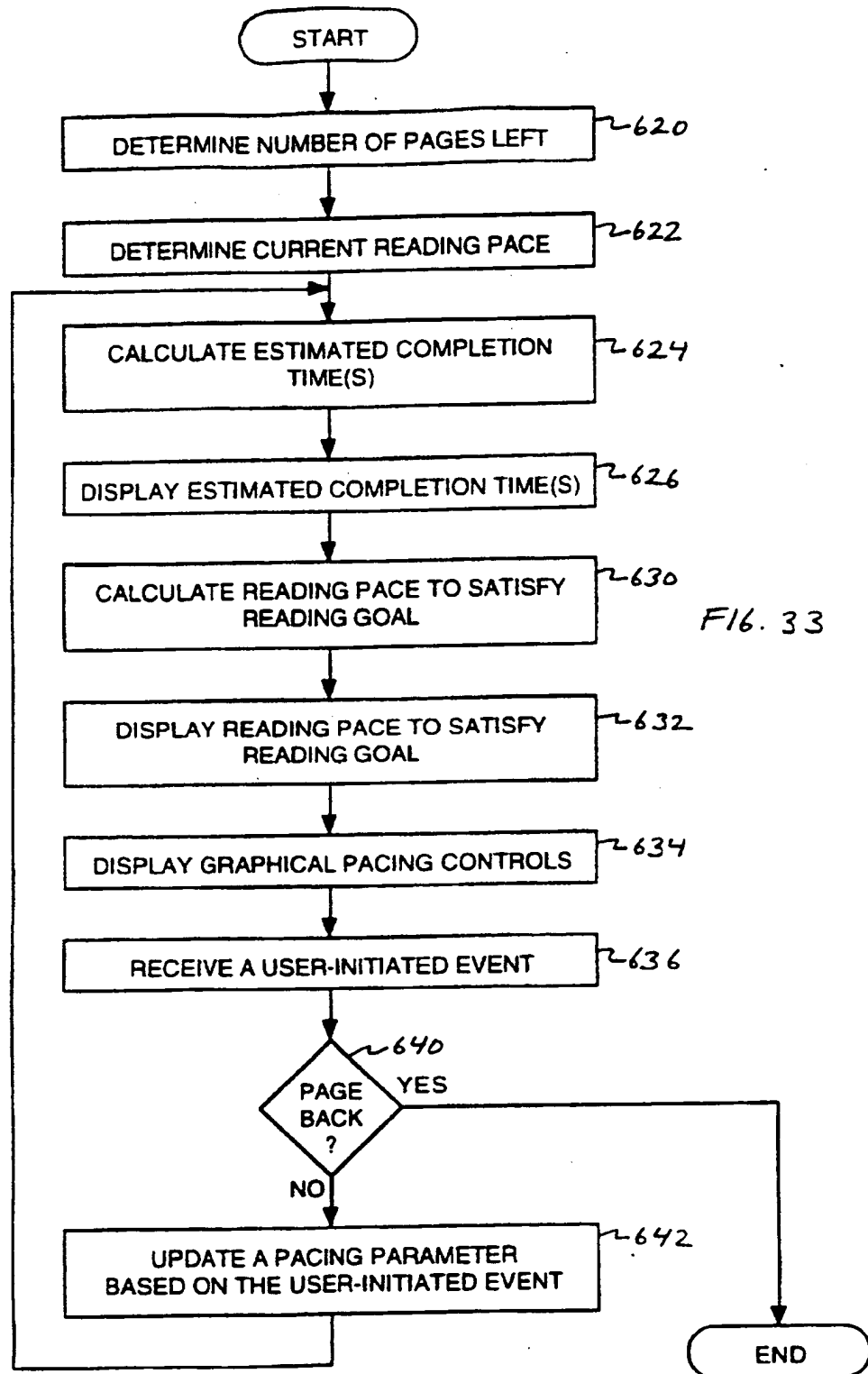
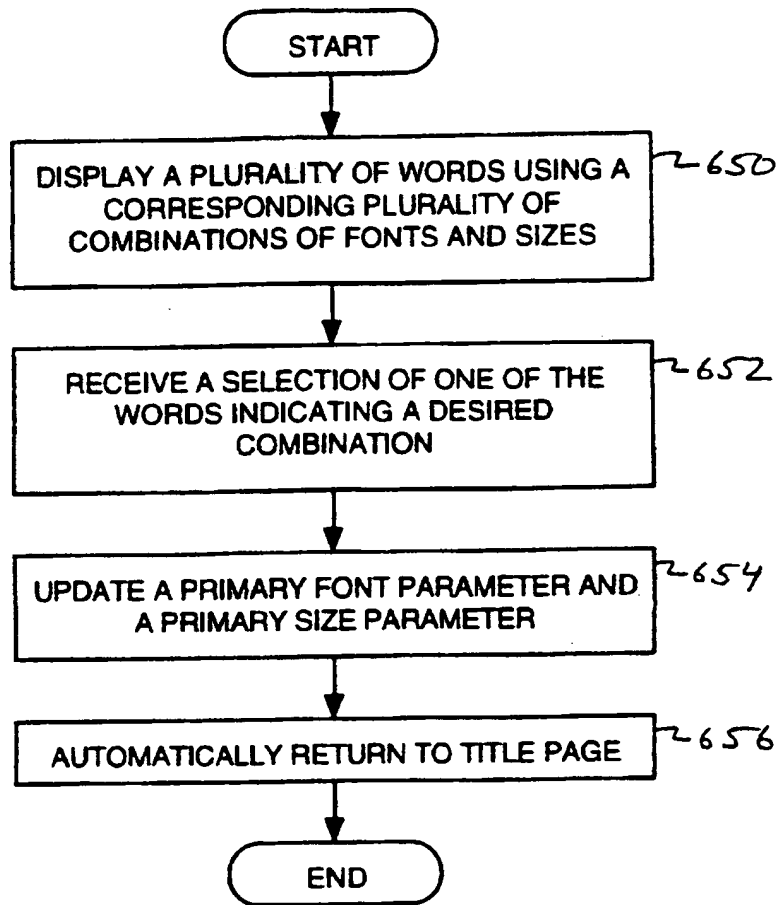


FIG. 31





*F16. 34*

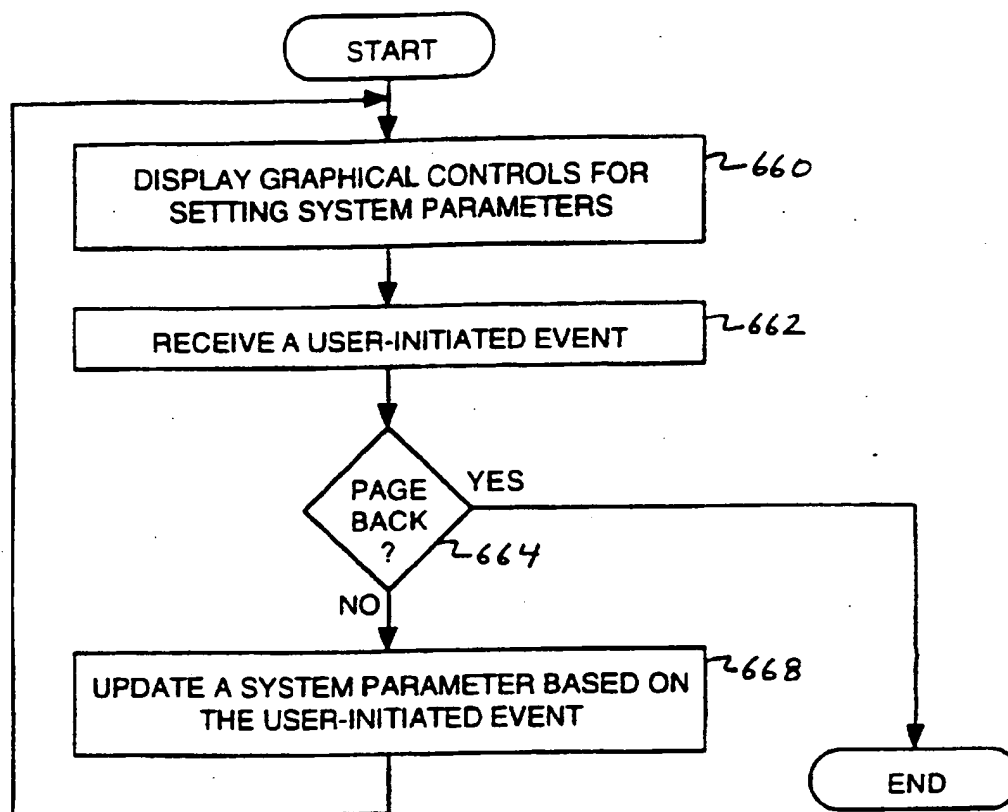


FIG. 35

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/19711

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G06F 17/21

US CL :345/901

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 395/788, 792, 793; 345/901, 121

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS, DIALOG, MAYA

search terms: (electronic or paperless)(W)(book or novel)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,855,725 A (FERNANDEZ) 08 August 1989, col. 2, lines 28-42, col. 3, lines 18-23.	1-10
Y	US 5,475,398 A (YAMAZAKI ET AL.) 12 December 1995, entire document, especially col. 1, line 35 to col. 2, line 15.	1-10
Y	Wright, Fred Jr., A retiree who has spent a lifetime tinkering with electronics has dreamed up a device to read computrized books, Tampa Tribune, 26 August 1995, entire document, especially first paragraph.	1-10
Y	Crowninshield software and attica cybernetics announce mediabase windows: first interface for multimedia cd-roms to run under microsoft windows 3.0, News Release, 22 May 1990, second paragraph.	1-10

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"A" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

04 MARCH 1997

Date of mailing of the international search report

16 APR 1997

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/19711

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Franklin Electronic Publishers: Is focusing its future on relatively inexpensive devices to look up reference material, Wall Street Journal, 25 May 1993, p. B4, entire document.	1-10
Y	US 5,321,609 A (YIANILOS ET AL.) 14 June 1994, cols. 1 and 2.	1-10
Y,P	US 5,523,775 A (CAPPS) 04 June 1996, col. 1, lines 13-41, col. 4, lines 43-53.	3
Y	US 5,119,079 A (HUBE ET AL.) 02 June 1992, cols. 1 and 2.	3
Y	US 4,914,624 A (DUNTHORN) 03 April 1990, col. 1, lines 44-66.	3
Y	US 5,404,458 A (ZETTS) 04 April 1995, col. 1, line 23 to col. 2, line 21.	3